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GOVERNMENT GAZETTE

BOLETIM OFICIAL

SUPPLEMENT

(SUPLEMENTO)

GOVERNMENT OF GOA, DAMAN AND DIU

Industries and Power Department

Notification

7/3/66-IND(A)/2738

In exercise of the powers conferred by Sub-Section 4 of Section 50 of the Goa, Daman and Diu Weights and Measures (Enforcement) Act 1968, the Administrator of Goa, Daman and Diu hereby publishes the following draft Notification regarding the Goa, Daman and Diu Weights and Measures (Enforcement) Rules, 1968 for general information of the public.

Any member of the public who is interested to offer his comments or suggestions on the following draft Rules may send the same to the Secretary, Government of Goa, Daman and Diu, Industries and Labour Department, Secretariat, Panaji within 30 days from the date of publication of the following draft Notification.

By order and in the name of the Administrator of Goa, Daman and Diu.

S. R. Shinde, Under Secretary, Industries and Labour Department.

Panaji, 28th October, 1968.

Goa, Daman and Diu Weights and Measures
Enforcement Rules 1968

DRAFT

Notification

In exercise of the Powers conferred by section 50 of the Goa, Daman and Diu Weights and Measures

(Enforcement) Act, 1968, the Administrator, Goa, Daman and Diu hereby makes the following rules, namely:

1. **Short title.** — These rules may be called the Goa, Daman and Diu Weights and Measures (Enforcement) Rules, 1968.

2. **Definitions.** — (1) In these rules, unless the context otherwise requires. —

(a) 'Act', means the Goa, Daman and Diu Weights and Measures (Enforcement) Act, 1968.

(b) 'capacity' in reference to

(i) 'weighing instrument' means the maximum weight that can be weighed by the weighing instrument;

(ii) 'measuring instrument' means the maximum length or maximum volume of the measuring instrument which is constructed to show or contain.

(c) 'correct' in reference to a weight or measure or weighing or measuring instrument means a weight or measure or weighing or measuring instrument which falls within the limits specified in the Schedule;

(d) 'reference standards' means the set of standard weights and measures referred to in section 5 of the Act;

(e) 'Schedule' means a Schedule appended to these rules;

(f) 'secondary standards' means the sets of standard weights and measures referred to in section 4 of the Act;

(g) 'working standards' means the sets of standard weights and measures referred to in section 3 of the Act;

(h) 'vehicle' means any carriage, cart, wagon, truck, barrow, trailer, tanker or any other means of carrying articles or commodity in whatever manner the same may be drawn or propelled or ferried.

(2) All words and expressions used but not defined in these rules and defined in the Act shall have the meaning respectively assigned to them in the Act.

3. Reference Standards.—The reference standards shall be kept in the custody of the Controller.

4. Secondary Standards.—(1) The Secondary standards shall conform as regards denomination, material used in construction and design to the specifications, laid down in Schedule I.

(2) The secondary standards shall be kept at such places, in such manner and in such custody as the Controller may direct.

(3) A secondary standard shall be verified with the reference standard at least once in every period of five years; adjusted if necessary, and marked with the date of verification by the Controller.

(4) The limits of error which may be tolerated in the secondary standards on verification or re-verification after adjustment shall be as specified in Schedule I.

5. Working Standards.—(1) The working standards shall conform as regards denominations, material used in construction and design, to the specifications laid down in Schedule II.

(2) The working standards shall be prepared by such agency and authenticated by such person or authority as may be specified by the State Government from time to time.

(3) The working standards shall be kept in the custody of the Inspectors.

(4) A working standard shall be verified with the secondary standard at least once in every twelve months, adjusted if necessary and stamped with the date of verification by the Controller or such other officer as may be authorised by the Controller in this behalf.

(5) The limits of error which may be tolerated in the working standards on verification or re-verification after adjustment shall be as specified in Schedule II.

6. Precision Balances.—(1) The Controller shall maintain a set of precision balances at the place where the reference standards are kept.

(2) The number, types and specifications of precision balances shall be as laid down in Schedule III.

(3) The Controller shall verify precision balances at least once in every twelve months, adjust them, if necessary, to make them correct within the limits of sensitiveness, certify and stamp them, if practicable with the date of verification.

7. Secondary Standard Balances.—(1) A set of secondary standard balances shall be maintained at every place where the secondary standards are kept.

(2) The number, types and specifications, of such balances shall be as laid down in Schedule III.

(3) The Controller shall cause to be verified such balances at least once in every five years and shall cause the same to be adjusted, if necessary, to make them correct within the limits of sensitiveness and to be stamped with the date of verification.

8. Working Standard Balances.—(1) The Controller shall supply to every Inspector a set of working standard balances with each set of working standard weights.

(2) The types and specifications of such balances shall be as laid down in Schedule IV.

(3) The Controller shall cause to be verified such balances at least once in every twelve months and shall cause the same to be adjusted, if necessary, to make them correct within the limits of sensitiveness and to be stamped with the date of verification.

9. Commercial Weights and Measures.—Commercial weights and measures of length and capacity shall conform as regards denomination material used in construction and design to the specifications laid down in Schedule V.

10. Weighing or Measuring Instruments.—(1) All weighing and measuring instruments used, or intended to be used, in transactions, for trade or commerce shall conform as regards capacities, material and design, to the specifications laid down in Schedules VI and VII.

(2) The limits of error which may be tolerated in such weighing and measuring instruments during verification and inspection shall be specified in Schedules VI and VII.

(3) Notwithstanding anything contained in Sub-rules (1) and (2), where any weighing or measuring instrument in use at the commencement of these Rules is converted to the metric system and its capacity after conversion cannot be made to conform to any of the specifications laid down in Schedules VI and VII, such instrument may continue to be used, but the limits of error which may be tolerated and sensitiveness in such instrument during verification and inspection shall be proportional to the limits of error and sensitiveness prescribed in the respective tables under the said Schedules.

11. Commercial weights etc, to be verified periodically.—(1) All measuring instruments used or intended to be used in transactions for trade or commerce and all weights, measures, and weighing instruments used or intended to be used in transactions for trade or commerce in bullion or precious stones or by a factory within the meaning of the Factory's Act 1948 or by railway administration within the meaning of the Indian Railway Act 1890 or Mines within the meaning of the Indian Mines Act 1957, shall be verified and stamped in accordance with the Act and these Rules at least once in a period of twelve months.

(2) All other weights, measures and weighing instruments used or intended to be used in transactions for trade or commerce shall be verified and stamped in accordance with the Act and these Rules at least once in a period of twenty four months.

(3) Notwithstanding anything contained in Sub-rules (1) or (2), any weighing or measuring instrument which has been verified and stamped *in situ*

shall, if it is removed and re-erected before the expiry of the period referred to in that sub-rule, be verified and stamped in accordance with the Act and these Rules on such removal or re-erection.

12. Inspection and verification of weights etc. —

(1) All weights, measures, weighing and measuring instruments, shall be verified in a clean condition, and if necessary, the Inspector shall require the owner or user to clean them; where necessary, they shall be complete with all accessories and installed as in normal conditions of use.

(2) Where a weight or measure or weighing or measuring instrument is brought to any Inspector for re-verification, the Inspector shall deal with it in the same manner as upon verification but it shall not be necessary for him to test a glass measure unless the original stamp has been defaced.

(3) Every person using any weight or measure in transactions for trade or commerce or for engineering measurements or for human safety shall present such weight or measure for verification at the Office of the Inspector or at such other place as the Inspector may specify in this behalf on or before the date on which the verification falls due.

Provided that —

where any such weighing or measuring instrument and weight or measure related thereto is of a type which cannot be moved from its location, such person shall report the date on which the verification falls due to the Inspector and shall take steps for verification of such weighing or measuring instrument and weight or measure related thereto.

(4) The denomination or capacity of a weight or measure, weighing or measuring instrument, if not marked in full, shall be indicated by one of the abbreviations specified in Schedule VIII.

(5) If the verification is done away from the Inspector's Office or camp office or at the premises of the manufacturer, stockist, owner, user, repairer or dealer, he shall be supplied with the necessary manpower, counterpoise weights, proving measures or any other help which may be required for such verification by the manufacturers, stockist, owner, user, repairer or dealer.

(6) The Inspector shall not be held responsible for any damage that a weight or measure, weighing or a measuring instrument, may sustain in the process of verification.

(7) An Inspector shall visit, as frequently as possible, during the period specified in rule 11, every factory or other place in the area under his charge to inspect and test any weight or measure, or weighing or measuring instrument which is or is believed to be used or is in possession of any person, or is on premises for use in transactions for trade or commerce.

(8) In case the Inspector is denied entry into any premises or the premises are believed to be unoccupied, the Inspector may enter the premises in the presence of or on the strength of a permission granted by a Judicial Magistrate, First Class.

13. Stamping of weights measures, etc. — (1) Before stamping any weight or measure or weighing

or measuring instrument, the Inspector shall satisfy himself that such weight or measure or weighing or measuring instrument complies with the requirements of the Act and these rules.

(2) Any weight or measure or weighing or measuring instrument, presented for verification shall be complete in itself, and shall not bear a manufacturer's or dealer's mark which might be mistaken for the Inspector's stamp.

(3) The Inspector shall stamp every weight, measure, weighing and measuring instrument with a stamp of uniform design issued by the Controller, indicating the year and its quarter in which it has been stamped or the Inspector by whom it is stamped or both, as directed by the Controller.

Provided that —

(a) no weight or measure or weighing or measuring instrument shall be stamped, which is not in the opinion of the Inspector, sufficiently strong to withstand the wear and tear of ordinary use in trade; and

(b) no weight or measure or weighing or measuring instrument manufactured after the coming into force of these rules other than class A beam scales specified in Schedule, shall be stamped unless provided by the manufacturer with a plug or stud of soft metal on which to place the Inspector's stamp, such plug or stud being made irremovable by undercutting or in some other suitable manner.

Note:— Sheet metal weights which on verification are found to be defective and, therefore, rejected, shall be broken up or mutilated by the Inspector before they are returned to the parties concerned.

(4) On completion of verification and stamping the Inspector shall issue a certificate of verification in the form specified in Schedule IX.

14. Sealed packages, containers, etc. — The limits of error which may be tolerated in the weight or measure of an article sold or delivered for sale in sealed packages or containers shall be as specified in the Schedule X.

15. Weighing and measuring practices. — (1) Every person using a beam scale in transactions for trade or commerce shall suspend the same from a stand or by a chain so that the beam oscillates freely and the height of each pan above the base or counter, at equilibrium is not less than one-tenth of the total length of the beam.

Provided that —

If the State Government is satisfied that the requirements of this sub-rule cannot be immediately complied with by any class of persons, the State Government may, by notification in the *Official Gazette*, exempt such a class of persons from the provisions of this sub-rule for such period as may be specified in the notification.

(2) No pieces of paper, cloth or weights or other materials shall be placed on the pan or pans of a weighing instrument when it is not being used for weighing.

(3) To ensure that the customer gets the net weight of a commodity, any bag, paper, carton or other material intended to serve as the container for a commodity shall be tared accurately before weighing out the commodity.

Provided that —

in the case of weighing machines with dials care shall be taken to tare the container before weighing out the commodity, and

Provided further that —

crude mass or the commodity itself or any material similar to it shall not be used for taring.

(4) No weight other than a bullion weight shall be used in any transaction for trade or commerce in bullion and no weight other than a carat weight shall be used in any transaction for trade or commerce in precious stones.

(5) All weights, measures, weighing and measuring instruments shall be installed on a level and stable base at such height as facilitates the observance of the accuracy of weighing by the customer.

(6) The pointer of dial type machines shall remain at the zero mark when the pan or pans are empty.

(7) No person shall use the class of beam scales other than those prescribed in the Schedule to be used for class of commodity in transaction for trade or commerce.

16. Procedure for carrying out inspection etc. — In carrying out inspection, verification and stamping of weights or measures or weighing or measuring instrument, the Inspector shall observe the procedure laid down in Schedule XI in addition to Schedule V, Schedule VI and Schedule VII.

17. Report of Inspectors. — Every Inspector shall submit a report to the Controller or Assistant Controller showing the work one by him for such period and shall reach the Controller or the Assistant Controller as the case may be on such date as may be specified from time to time.

18. Obliteration of stamp. — The Inspector, on inspection shall obliterate the stamp on

a) any weight or measure or weighing or measuring instrument which cannot be made to conform to the requirements of these rules;

b) any weight or measure or weighing or measuring instrument if it does not admit of proper adjustment owing to its being broken, indented or otherwise defective;

c) any weight or measure or weighing or measuring instrument, which since the last stamping, has been repaired or readjusted so as to cease to conform to the requirements of these rules;

d) any weight or measure or weighing or measuring instrument due and not submitted for re-verification and stamping;

e) any weight or measure or weighing or measuring instrument if the error exceeds the limits allowed at the time of inspection;

Provided that —

Where the error referred to in clause (e) is not, in the Inspector's judgement, such as to require the immediate obliteration of the stamp, he shall serve a notice on the owner or user, informing him of the defects found in the weight or measure or weighing or measuring instrument and calling upon him to remove the defects within a stated period not exceeding eight days and shall —

i) if the owner or user fails to have them corrected within that period, obliterate the stamp, or

ii) if the weight or measure or weighing or measuring instrument is adjusted to remove the defects within the stated period, reverify the weight or measure or weighing or measuring instrument and stamp the same, if found correct.

Provided further that —

Where the defect in a weighing instrument may be corrected by re-balancing, the stamp shall not be obliterated.

19. Fees for verification, adjustment and stamping. — (1) Fees payable for verification and stamping of weights, measures, weighing and measuring instruments at the office or camp office of the Inspector shall be as specified in Schedule XII.

Provided that —

In the case of a recalibrated instrument, the capacity of which does not correspond to a prescribed capacity, the fee charged shall be that prescribed for the next higher capacity.

(2) If verification is done at any premises other than the office or camp office of the Inspector, an additional fee shall be charged at half the rates specified in Schedule XII and the owner or user, as the case may be, of the weight or measure or weighing or measuring instrument shall also pay the expenses incurred by the Inspector for visiting the premises including the cost of transporting and handling the equipment.

Provided that —

No additional fee shall be charged for verification and stamping *in situ* of:

a) petrol or fuel vehicles, weighbridges, dormant platform machines, automatic weighing machines, totalising machines and such other instruments as may be specified in this behalf by the Controller, and

b) weights and measures, weighing and measuring instruments in the premises of a manufacturer, or stockist, of such weights and measures, weighing and measuring instruments.

20. No fees to be charged for restamping within a certain period. — Notwithstanding anything contained in rule 19, no fee shall be payable for re-stamping any weight or measure or weighing or measuring instrument within the period specified in rule 11 from the date on which it was last stamped, provided the original stamp was not obliterated under rule 18.

21. Fees for re-verification under rule 18 after adjustment. — The fees for re-verification of weights or measures or weighing or measuring instruments after adjustment, as provided in rule 18, shall be charged at the rates specified in Schedule XII.

22. Collection of fees and deposit into the treasury. — (1) Before commencing the work of verification or re-verification, the Inspector shall inform the person concerned of the fees payable by him under these rules and shall receive the same and issue a receipt in the form approved by the Controller, a copy of such receipt being kept on record.

(2) A weight or measure or weighing or measuring instrument which on verification is found to be incorrect shall be returned to the person concerned

for adjustment. When the necessary adjustment has been carried out, such weight, measure or weighing or measuring instruments shall be re-verified on payment of 50 per cent of the fees prescribed in Schedule XII and if found correct shall be stamped.

(3) When a weight or measure, or weighing or measuring instrument is returned as incorrect, the Inspector shall inform the person concerned in writing of the defects found in the weight, measure or weighing or measuring instrument.

(4) The Inspector shall maintain a register in the form approved by the Controller which shall be written up from day to day and shall show the amount of fees and carriage charges collected during the day.

(5) Weight or measure or weighing or measuring instrument that has found to be unacceptable for stamping and cannot be adjusted shall be disposed of in such manner as may be directed by the Controller in this behalf.

(6) All payments received by the Inspector during the preceding week shall be paid into the Government Treasury every Monday for credit to such «Head of Account» as may be specified by the Controller from time to time and a receipt thereof be obtained and an intimation to that effect be sent to the Controller.

23. Seizure, detention and disposal of unauthorised weights and measures and packages.— (1) Weights Measures weighing and Measuring Instrument shall be liable to be seized and detained if:

- a) they are not of the denominations specified in Schedule V, Schedule VI and Schedule VII.
- b) they are false, defective or non-standard;
- c) fraud is committed in using them;
- d) they are unstamped;
- e) the stamp on them is forged or transferred.

(2) Any weight or measure or weighing or measuring instrument seized and detained under this rule, which is not to be the subject of proceedings in a court, shall, after the expiry of sixty days after its seizure, be so dealt with as the Controller may by general or special order direct, and the materials thereof shall be sold and the proceeds credited to the Government.

(3) Any weight or measure or weighing or measuring instrument seized and detained under this rule, which is to be the subject of proceedings in a court shall, as far as practicable, be produced by the Inspector before the court and shall, after conclusion of the proceedings, be taken possession of by the Inspector and dealt with in accordance with the instructions issued by the Controller in this behalf.

(4) If a perishable commodity or a package containing a perishable commodity is seized for short weight, short measure or any other offence under the Act and these Rules, the Inspector shall have the commodity weighed on a verified instrument available with him or near the scene of offence and enter the weight or measure of the commodity in a form specified for the purpose by the Controller, and have it signed by the trader, his agent or such

other person who has committed the offence. The commodity in question, shall be returned to the trader if it is not in packaged condition. If it is packaged, the Inspector shall retain the container or other device used for packaging as evidence of not quantity expected to be contained in the package and return the commodity to the offender.

(5) The document signed in sub-rule (4) above shall be considered by the Court as adequate evidence of short weight, short measure or other offence committed under this Act or these rules.

(6) The procedure to be adopted in respect of seizure, detention and disposal of Weights and Measures, etc. under this rule as far as possible shall be followed as specified in the Schedule XIII.

24. Qualifications of Controller, Assistant Controller and Inspectors.— (1) The qualification of the Controller and of Assistant Controller of Weights and Measures shall be the same as those prescribed from time to time under the proviso to article 309 of the Constitution of India.

Provided that the age limit for Assistant Controller shall not be more than 45 years.

(2) No person shall be appointed as Inspector unless he—

- (i) is a graduate of a recognised University preferably in Science or Engineering, or holds recognised Diploma in Engineering,
- (ii) is able to speak, read and write one of the local languages in the union territory of Goa, Daman and Diu, and
- (iii) on selection, has satisfactorily completed a course of training for not less than six weeks in an institution of the enforcement of weights and measures as approved by the Government.

(3) Nothing in Sub-rule (1) and (2) shall apply to persons who have been working as Assistant Controller or Inspector for a period of not less than a year immediately before the commencement of these rules.

25. Duties of Inspectors.— The duties of an Inspector are—

- a) verification and stamping of weights, measures, weighing and measuring instruments;
- b) inspection of weights, measures, weighing and measuring instrument and packages of commodities;
- c) collection of fees and other charges, and submission of the reports and returns prescribed in the rules or required by the Controller;
- d) safe custody of articles seized and detained in the course of his duty;
- e) safe and proper custody of the secondary and working standards and other equipment entrusted to his charge;
- f) keeping upto-date the census of traders and establishment in his area;
- g) maintenance of such books as may be specified by the Controller;
- h) such other duties under the Act and rules as the Controller may by special or general order specify.

26. Inspectors to be provided with working standards, balances etc. — Every Inspector shall be provided by the Controller with,

- i) Working standards, balances for testing weights, adequate instrumental and other equipment, travelling kit for the inspection of such material and form as may from time to time be necessary.
- ii) Such dies, punches, stencil plates, branding irons, etching and engraving and other implements as may be necessary for affixing verification stamp, the design and number of which shall be furnished by him.
- iii) Punches of suitable size, eight-pointed star of design as shown in the illustration below for the purpose of obliterating the stamps.



(2) In order to prevent improper and unauthorised use of verification punches, the Inspector shall —

- (i) keep an accurate inventory of all his stamps and stencils and check it at frequent intervals;
- (ii) keep all stamps and stencils under lock and key when not actually being used;
- (iii) deface without delay all worn out stamps and stencils, in presence of the officer authorised by the Controller;
- (iv) report immediately the loss of any stamp or stencil to the Controller through his immediate superior officer.

27. Power to relax. — Where in the special circumstances of any case it appears to an Inspector to be impracticable to comply fully with any requirement of these rules, he shall give intimation to the Controller to that effect and the Controller may, on receipt of such intimation, if he thinks fit, dispense with the compliance of such requirement:

Provided that —

before any such requirement is dispensed with, the Controller shall record in writing the reasons for doing so.

28. Licensing of manufacturers, repairers and dealers of weights, measures, etc. — (1) Every manufacturer or repairer of, or dealer in weights or measures or weighing or measuring instruments shall apply to the Controller in such forms as may be specified by him and shall obtain a licence from the Controller in the form set out in Schedule XIV and for renewal of the same he must apply at least ten days before its expiry and if he fails to do so he shall, within thirty days of the date of its expiry, surrender it to the Controller.

(2) The fees payable for such licence and its renewal shall be specified in Schedule XV, provided that after 10 days of expiry of the licence, in addition to the fees chargeable as aforesaid, an extra fee at rates equal to half the rates prescribed in

the said Schedule shall be charged if application for renewal is made within 30 days of the date of expiry.

(3) The fees payable for a duplicate copy of such licence shall be equal to 10 per cent of the fees specified in Schedule XV.

(4) The Controller may, by order, refuse to grant or renew the license or suspend or cancel the license of a manufacturer or repairer of, or dealer in, weights, measures, weighing or measuring instruments on the ground of want of proper and adequate workshop facilities or staff or incompetency or failure to observe any provisions of the Act or these rules:

Provided that no such order shall be made without giving the aggrieved person an opportunity of stating his case.

(5) The Controller shall maintain a register of licensed manufacturers, repairers and dealers in the form set out in Schedule XVI.

(6) Every manufacturer, repairer and dealer who has been granted a license under these rules shall on demand, by an officer appointed under section 18 produce the license for inspection.

29. Records to be maintained by manufacturer, etc. — Every manufacturer or repairer of, or dealer in weights or measures or weighing or measuring instruments shall maintain such records in such form and submit such returns as the Controller may, direct from time to time.

30. Certificate of verification to be exhibited. — (1) The person to whom a certificate of verification is issued shall exhibit the same in a conspicuous place in the premises where the weights or measures, weighing or measuring instrument to which the certificate relates are used.

Provided that —

in the case of a hawker, the certificate shall be kept on his person.

(2) A fee of rupee one shall be payable for copy of original certificate of verification.

31. Registration of Establishments. — (1) When any establishment is started, gifted away, transferred, shifted or closed, a declaration to that effect shall be sent by the owner, proprietor or any person responsible for management to the Controller or any other official appointed under the Act and authorised in this behalf, within a month of its starting, shifting or gifting away and by the last owner in the case of transfer or closure.

(2) Every person is required to register himself with the Controller or the officer appointed under the Act and authorised by the Controller in this behalf, within fifteen days, to use any weight or measure or weighing or measuring instrument, in transaction for trade or commerce.

(3) Owner, proprietor or any person responsible for the management of the establishment using or possessing for use any weight or measure or weighing or measuring instrument, in transaction for trade or commerce, shall apply for registration in the form as specified in the Schedule XVII to the Controller.

(4) The Controller or any other person appointed under the Act and authorised in this behalf shall register and issue a certificate in the form specified in the Schedule XVII.

Note: — Forms specified in Schedule XVI and XVII is applicable to sub-rule (1) of this Rule.

32. Appeals. — (1) Any person aggrieved by an order of an Inspector or an Assistant Controller, may prefer an appeal to the Controller in the form given in Schedule XVIII, within 60 days from the date of communication of such order.

(2) A court fee label of Rs. 2/- shall be affixed on the appeal petition.

(3) The order against which the appeal is preferred shall be enclosed in original.

(4) The appellant may, if he so desired, be heard in person or through an authorised representative by the Controller.

33. Penalty. — Any person who contravenes any provision of these rules shall be punishable with fine which may extend to five hundred rupees.

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SCHEDULE I

(See Rule 4)

Denominations, material, shape and permissible errors of Secondary Standards of Weights and measures

PART I

Secondary standard weights

1. Denominations. —

Kilogram Series (kg)	Gram Series (g)	Milligram Series (mg)
10	500	500
5	200	200
	200	200
	100	100
2	50	50
2	20	20
	20	20
	10	10
1	5	5
	2	2
	2	2
	1	1

2. Material.—(a) Weights of 20 kg to 1 g shall be cast from admiralty bronze of the following composition:

Constituent	Per cent
Tin	9.50 to 10.50
Zinc	1.50 to 2.50
Lead (Maximum)	0.50
Nickel (Maximum)	1.00
Other elements	0.10
Copper	Remainder

(b) Weights of 500 mg. to 50 mg. shall be made of cupro-nickel of the following composition:

Copper	79 to 81 per cent
Nickel	19 to 21 per cent
Total impurities not to exceed	1.5 per cent

(c) Weights of 20 mg. to 1 mg. shall be made of commercially pure aluminium sheets. Copper, Silicon and iron contained as impurities in commercially pure aluminium shall not exceed 0.3 per cent.

3. Shape.—(a) For kilogram and gram series—Integral Cylindrical body with knobs flattened at the top. Weights of 10 kg. to 100 g. (inclusive) shall have adjusting devices. Lead shall not be used as an adjusting material.

(b) For milligram series, the weights shall be in the form of square sheets, one of the corners being bent at right angles.

(c) The denominations shall be marked on the weights.

4. Permissible Errors.—The permissible errors in excess and in deficiency shall be as follows:—

Denomination	Permissible Error	
	in excess mg.	in deficiency mg.
10 kg	50	25
5 kg	25	12.5
2 kg	15	7.5
1 kg	10	5
500 g	5	2.5
200 g	4	2
100 g	3	1.5
50 g	2	1
20 g	1.5	0.75
10 g	1	0.5
5 g	0.8	0.4
2 g	0.6	0.3
1 g	0.4	0.2
500 mg	0.4	0.2
200 mg	0.2	0.1
100 mg	0.2	0.1
50 mg	0.1	0.05
20 mg	0.1	0.05
10 mg	0.05	0.02
5 mg	0.05	0.02
2 mg	0.05	0.02
1 mg	0.02	0.02

PART II

Secondary standard capacity measures

1. Denomination:—

Litre Series (l.)	Millilitre Series (ml)
5	500
2	200
1	100
	50
	20

2. Material.—Secondary standard measures of capacity shall be cast out of admiralty bronze of the same composition as is employed in the case of Secondary standard weights.

3. Shape.—(a) The 5 litre measure shall be cylindrical and have its inside diameter equal to the height of the measure. This shall have two handles attached securely to its sides.

(b) Measures of 2 litres and below shall be of the same shape as above but shall not have any handles.

(c) The denominations of the measures shall be engraved on the outside surface.

(d) Each set of measures shall be supplied with specially selected striking glasses.

4. Permissible Errors.—The permissible errors in excess and deficiency shall be as follows:—

Denomination	Permissible Error	
	in excess (ml)	in deficiency (ml)
5 l	2	2
2 l	1	1
1 l	0.8	0.8
500 ml	0.5	0.5
200 ml	0.4	0.4
100 ml	0.3	0.3
50 ml	0.2	0.2
20 ml	0.1	0.1

PART III

Secondary standard length measure

1. Material.—58 per cent nickel-steel.

2. Section.—Rectangular cross-section with dimensions 30 mm x 15 mm. The top surface shall have two rectangular grooves, along its length.

3. Overall length.—1030 mm.

4. Graduated length.—1010 mm.

5. Finish.—Bright, highly polished.

6. Graduations.—Graduated in mm throughout.

7. Thickness of graduation marks.—Not less than 30 microns and not more than 50 microns.

8. Tolerance.—The maximum permissible errors in the graduations shall be (i) +25 microns between any two adjacent mm marks, provided that the error between any two consecutive cm marks shall, also not exceed +25 microns, and (ii) +50 microns between any two marks more than 10 cm apart.

SCHEDULE II

(See Rule 5)

Denominations, material, shape and permissible errors for working standards of weights and measures

PART I

Working standard weights

1. Denominations.—

Kilogram Series (kg)	Gram Series (g)	Milligram Series (mg)
—	500	500
20	200	200
10	200	200
...	100	100
5	50	50
2	20	20
2	20	20
1	10	10
...	5	5
...	2	2
...	2	2
...	1	1

2. Material.—(a) Weights of 20 kg to 1 g shall be cast from admiralty bronze or cupro-nickel of the following composition:—

Admiralty Bronze

Constituent	Percent
Tin	9.50 to 10.50
Zinc	1.50 to 2.50
Lead (Maximum)	0.50
Nickel (Maximum)	1.00
Other elements	0.15
Copper	Remainder

Cupro-nickel

Copper	79 to 81
Nickel	19 to 21
Total impurities not to exceed	1.5 per cent.

(b) Weights of 500 mg to 100 mg shall be made of admiralty bronze (rolled) sheets (Composition as in (a) above).

(c) Weights of 50 mg to 1 mg shall be made of commercially pure aluminium sheets. Copper, silicon and iron contained as impurities in commercially pure aluminium shall not exceed 0.3 per cent.

3. Shape. — (a) Weights of 20 kg and 10 kg shall be cylindrical in shape and shall be cast in two halves, the top half being screwed snugly into the bottom half. The top half shall be cast in the form of a handle for lifting purposes. The two halves after assembly shall be locked by means of a set-screw over which the seal of the verifying authority shall be stamped.

(b) Weights of 5 kg to 200 g (inclusive) shall be cylindrical in shape and shall be cast in two halves, the top half being screwed snugly into the bottom half. The top half shall be cast in the form of a knob for lifting purposes. The two halves, after assembly shall be locked by means of a set-screw over which the seal of the verifying authority shall be stamped.

(c) Weights of 100 g to 10 g shall be as in (b) above except that there shall be no locking arrangement.

(d) Weights of 5 g to 1 g shall be cylindrical in shape and shall be integral solid weights.

(e) Weights of 500 mg to 1 mg (inclusive) shall be of square shape with one of the sides bent at right-angles to the flat surface for ease of handling.

(f) The denominations shall be marked on the weights.

4. Permissible Errors. — The permissible errors in excess and in deficiency shall be as follows:—

Denomination	Permissible Errors	
	in excess (mg)	in deficiency (mg)
20 kg	200	100
10 kg	100	50
5 kg	50	25
2 kg	30	15
1 kg	20	10
500 g	10	5
200 g	8	4
100 g	6	3
50 g	4	2
20 g	3	1.5
10 g	2	1
5 g	1.6	0.8
2 g	1.2	0.6
1 g	0.8	0.4
500 mg	0.8	0.4
200 mg	0.4	0.2
100 mg	0.4	0.2
50 mg	0.2	0.1
20 mg	0.2	0.1
10 mg	0.1	0.05
5 mg	0.1	0.05
2 mg	0.1	0.05
1 mg	0.05	0.05

PART II

Working standard capacity measures

1. Denominations.—

Litre Series(l)	Millilitre Series (ml)
20	500
10	200
5	100
2	50
1	20

2. Material. — Working standard capacity measures shall be pressed out of oxygen free, de-oxidised annealed copper sheets of deep drawing quality.

3. Shape. — (i) Working standard capacity measures of 20 and 10 litres shall be cylindrical with the handles securely fixed to the sides.

(ii) All other Working standard capacity measures shall also be cylindrical but shall not be provided with handles. The diameter of each measure shall approximately be equal to the height of the measure. The measures shall be suitably re-inforced.

(iii) The denominations of the Working standard measures shall be engraved on the outside surface.

(iv) The outside of the body of the Working standard measures shall be oxidised to give a smooth dull black surface and the inside shall be tinned.

(v) Each set of Working standard capacity measures shall be supplied with specially selected striking glasses and the measures and glasses shall be securely packed in velvet lined teak wood boxes.

4. Permissible Errors. —

Denomination	Permissible Errors	
	in excess (ml)	in deficiency (ml)
20 l	16	16
10 l	8	8
5 l	4	4
2 l	2	2
1 l	1.5	1.5
500 ml	1.0	1.0
200 ml	0.8	0.8
100 ml	0.6	0.6
50 ml	0.4	0.4
20 ml	0.2	0.2
10 ml	0.2	0.2

5. Pipette Measures. — Pipette of the following description may also be used as Working standard measures. —

(i) One mark pipette of capacities 10 ml and 5 ml.

(ii) Graduated pipette of capacities 5 ml graduated at every tenth of a ml.

PART III

Working standard length measures

1. Material. — The Working standard length measures shall be manufactured out of pure nickel (cobalt free) with a minimum of 99.0% nickel.

2. Shape and Dimensions. — The standard shall be of rectangular cross section of dimensions 30 mm. X 15 mm. The total length shall be 1030 mm. The standard shall be finished bright.

3. Graduations. — (a) The standard shall be graduated over a length of 1010 mm., from 10 mm. behind the zero line to 1000 mm. beyond. From — 10 mm. to + 10 mm., it shall be graduated in millimetres and from + 10 mm. to 1000 mm., every 5 mm.

(b) The thickness of the graduation marks shall be between 50 and 80 microns.

(c) The length of the graduation marks shall be —

On every cm mark	8 mm.
On every 5 mm mark	5 mm.
On every mm mark	3 mm.

4. Tolerance. — The maximum permissible error on the length from 0 to 1000 mm. shall be + 0.1 mm., and between any two consecutive mm., 5 mm., and 10 cm. mark + 0.05 mm.

5. Marking. — The standard shall have an Ashok Chakra and a distinctive mark to identify the manufacturer engraved along the centre line of the top surface. The height of the numerals and the letters shall be approximately 3 mm.

6. Provision for stamping. — The standard shall be provided with a tapered hole to accommodate a stamping plug. This hole shall be approximately 5 mm. in diameter and 3 mm. in depth.

7. Auxiliaries. — The standard shall be housed in a suitable teak wood box with a carrying handle.

SCHEDULE III

(See Rule 6 and 7)

Specifications for precision and secondary standard balances

Range of Balances

Capacities	Sensitiveness mg/division of the scale
20 kg	5
5 kg	1
1 kg	0.5
200 g	.05 or 0.1
20 g	0.01
2 g	0.005

Note. — 1. Precision and Secondary Standard Balances shall be used only for indoor work in laboratories and shall be handled carefully by competent trained personnel. The balances shall be designed according to well established practice of Precision Balances Manufacturers.

2. Both Precision and Secondary Balances shall be manufactured to the specifications given above.

SCHEDULE IV

(See Rule 8)

Specifications for working standard balances

1. Range of Balances. —

Capacity	Sensitiveness mg/division of scale	Approximate beam length
50 kg	100	750 mm
5 kg	10	250-300 mm
200 g	1.0	150-200 mm
2 g	0.02	120-150 mm

2. Types. — Working standard balances shall be of both indoor and outdoor types.

3. Design and Construction. — The balances shall be constructed of non-magnetic materials and shall be robust, in construction. They shall be capable of being easily assembled. Outdoor type balances shall be fitted in suitable carrying cases to enable the balances to withstand rough transport conditions. Smaller balances, i.e. capacity 5 kg and below, shall be provided with glass cases. Portable balances of capacity 5 kg and below shall be filled into one carrying case for case of transportation.

SCHEDULE V

(See Rule 9)

PART I

Commercial weights other than carat weights

1. Denominations. — The denominations of the different types of weights shall be as follows: —

(a) Iron and Steel weights

50 kg	500 g
20 kg	200 g
10 kg	100 g
5 kg	50 g
2 kg	...
1 kg	...

(b) Brass and bronze weights

Bullion		Other than bullion
20 kg	500 g	1 kg 500 g
10 kg	200 g	200 g
5 kg	100 g	100 g
2 kg	50 g	50 g
1 kg	20 g	20 g
	10 g	10 g
	5 g	5 g
	2 g	2 g
	1 g	1 g

(c) Sheet metal weights (Bullion and other than bullion).

500 mg
200 mg
100 mg
50 mg
20 mg
10 mg
5 mg
2 mg
1 mg

The actual series to be used in practice shall consist of two weights of denominations 2, 20 or 200.

2. Iron and Steel Weights. — (a) Material. — Weights of 50 kg and down to and including 5 kg shall be made only of cast iron. Weights of 2 kg and down to and including 50 g shall either be made of cast iron or forged mild steel.

(b) Shapes and dimensions. — The shapes and dimensions of cast iron weights shall conform to Fig. 1 and 2 read with Tables 1 and 2 and those of mild steel shall conform to Fig. 2 read with Table 2.

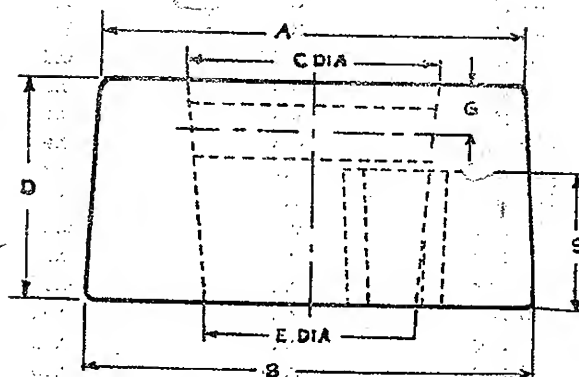
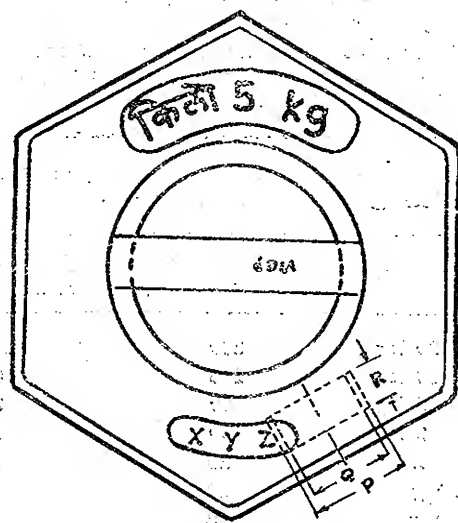


Fig. 1 — Cast iron weight with cast-in hand

TABLE 1

Dimensions of Cast Iron Weights with Handle

Denomination	A	B	C	D	E	G	P	Q	R	S	d
50 kg	236	253	134	170	100	27	58	48	24	102	32
20 kg	188	200	112	113	90	21	44	38	19	66	22
10 kg	152	161	92	88	74	18	36	30	15	54	19
5 kg	125	132	75	65	62	15	29	25	12	40	16

All dimensions in millimetres.

Tolerance on dimensions ± 5 percent.

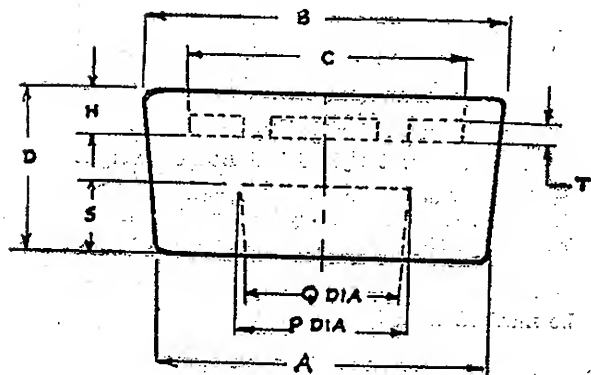
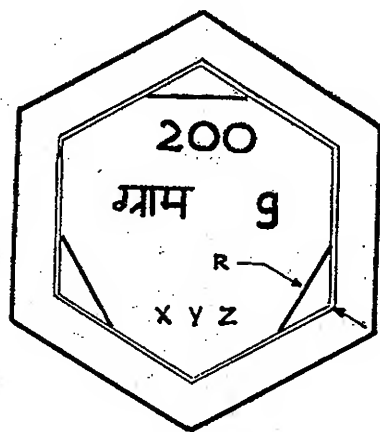


Fig. 2—Cast iron or forged mild steel weight

TABLE 2

Dimensions of Cast Iron or Forged Mild Steel Weights

Denomi- nation	A	B	C	D	H	F	Q	R	S	T
2 kg.	94	101	76	40	10	34	30	9	18	4
1 kg.	73	79	60	34	8	32	28	8	16	4
500 g.	57	62	46	27	6	23	20	6	13	3
200 g.	43	47	36	21	6	22	20	4	9	3
100 g.	34	36	28	16	4	18	16	3	7	2.5
50 g.	26	28	22	13	3	16	14	3	4	2

All dimensions in millimetres

Tolerance on dimensions:

- (a) for weights above 1 kg. ± 5 per cent
(b) for weights 1 kg. and below ± 10 per cent

(c) Cast-in-handles. — Weights of denominations of 50 kg. and down to and including 5 kg. shall be provided with cast-in-handles made of mild steel.

(d) Nesting of weights. — Weights of denominations of 2 kg. and down to and including 50 g. shall nest with each other.

(e) Loading holes. — Weights with cast-in-handles (see Fig. 1) shall have one rectangular loading hole on the under surface, tapering outside along the width while the nesting weights (See Fig. 2) shall have one round loading hole, tapering outwards in the centre of the under surface.

(f) Permissible errors. —

Denomination	Verification	Inspection	
	Errors in excess only	Excess	Deficiency
	mg.	mg.	mg.
50 kg.	24,000	Errors same as in verification	12,000
20 kg.	10,000		5,000
10 kg.	5,000		2,500
5 kg.	3,000		1,500
2 kg.	1,600		800
1 kg.	1,000		500

Denomination	Verification	Inspection	
	Errors in excess only	Excess	Deficiency
500 g.	600		300
200 g.	400		200
100 g.	320		160
50 g.	200		100

Note: — New weights, when presented for verification and stamping shall not weigh less than the denomination value plus 50 per cent of the excess tolerance shown above.

3. Brass and Bronze Weights: —

(a) Material: — The weights shall be made of cast brass or cast bronze, or pressed or turned from brass rods.

(b) Shape and dimensions. — Brass and bronze weights shall be of the following types —

(1) Bullion Weights:

(i) Weights of denominations of 20 kg. and down to and including 1 g. shall be cylindrical in shape, with a handle for 20 kg. and 10 kg. weights and a knob for the rest of the denominations. Shapes and dimensions shall conform to Fig. 3 and 4 read with Tables 3 and 4 respectively. Weights of 20 kg. down to and including 200 g. shall be marked with the words 'Bullion' and 'बुलियन' within a 'diamond' as shown in Fig. 3 and 4 and weights of 100 g. down to and including 10 g. shall be marked with only a 'diamond'.

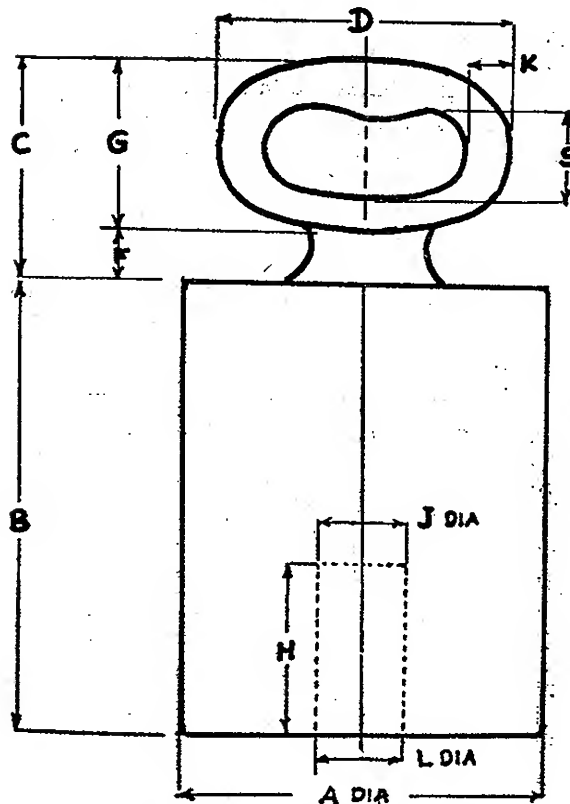
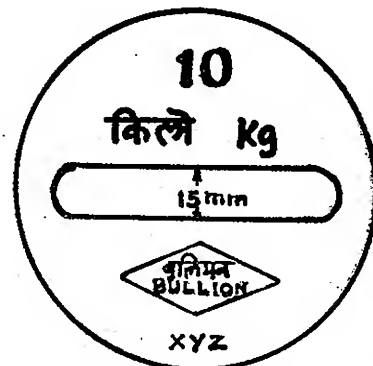


Fig. 3—Cylindrical Bullion weight with Handle

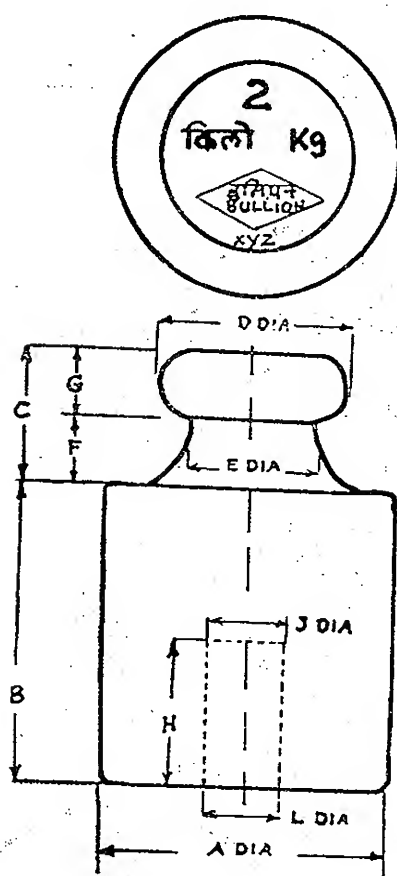


Fig. 4—Cylindrical Bullion weight with Knob

TABLE 3

Dimensions of Cylindrical Bullion Weights with Handle

Denominations	A	B	C	D	E	F	G	H	L	J	K	S
20 kg.	133	157	71	106	41	16	55	51	25	26	14	25
10 kg.	106	130	64	85	33	14	50	49	25	26	13	25

All dimensions in millimetres.

Tolerance on dimensions ± 5 percent.

TABLE 4

Dimensions of Cylindrical Bullion Weights with Knob

Denomination	A	B	C	D	E	F	G	H	L	J
5 kg.	86	88	41	56	37.5	22.5	18.5	38	19	20
2 kg.	64	67	27	39	24	14	13	27	17	17.5
1 kg.	50	50	23.5	33	21	12	11.5	25	16	17
500 g.	41	39	20	25	17	10.5	8.5	19	16	17
200 g.	32	29	16	20	12	9	7	13.5	13	13.5
100 g.	24	24	12	17	9.5	6	6	11	11	12
50 g.	19	19	10	14	8	5	5	9	9.5	10
20 g.	14	14	6	10	6	3	3	6	6	7
10 g.	11	11	5	8	5	3	2	6	6	7
5 g.	9	9	4	6	4	2	2	6	6	7
2 g.	6	6	3	4	2	1.5	1.5	6	6	7
1 g.	6	6	2	3	1	1	1	6	6	7

All dimensions in millimetres

Tolerance on dimensions:

(a) for weights above 1 kg

(b) for weights 1 kg, and below

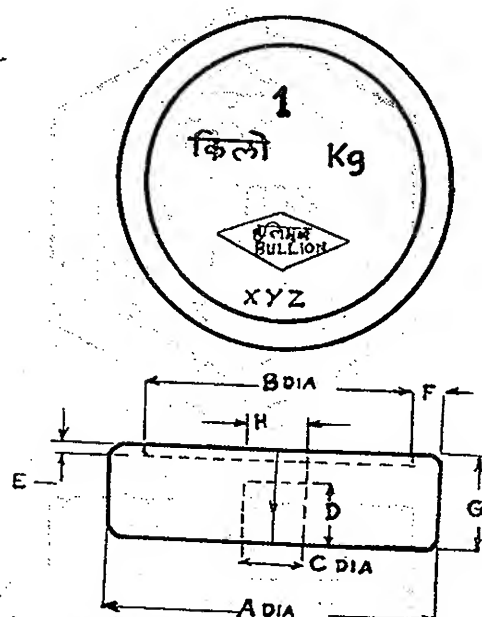
 ± 5 per cent ± 10 per cent

Fig. 5—Flat Cylindrical Bullion weight

- (ii) Weights of denominations 1 kg and down to and including 1 g. shall be flat cylindrical in shape (without a knob) and shall nest with each other. Shapes and dimensions shall conform to Fig. 5 read with Table 5. Weights of 1 kg. and down to and including 20 g. shall be marked with the words 'Bullion' and 'बुलियन' within a 'diamond' as shown in Fig. 5 and weights of 10 g. and below down to and including 1 g. shall be marked with only a 'diamond'.

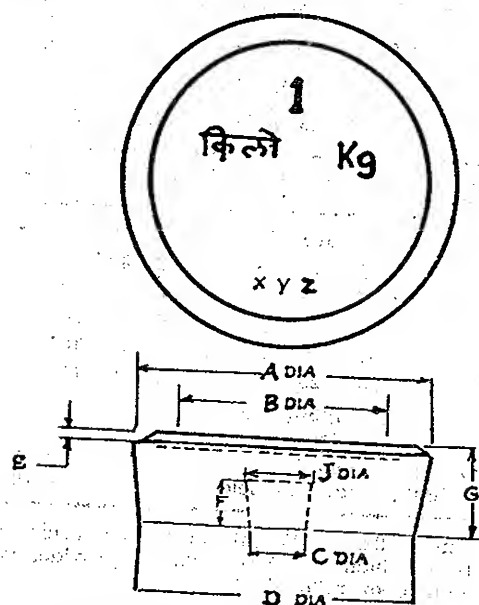


Fig. 6—Flat Cylindrical weight

TABLE 5

Dimensions of Flat Cylindrical Bullion Weights

Denominations	A	B	C	D	E	F	G	H
1 kg	82.5	66.5	16	16	3	8.0	24	17
500 g	65	49.5	16	13	2.5	7.75	19	17
200 g	48.0	38.5	13	9.5	2.5	4.75	14	14
100 g	37.5	29.5	11	7	2	4	11.5	12
50 g	28.5	22.5	9.5	6	1.5	3	10.5	10
20 g	21.5	17.5	8	4	1.5	2.0	7	8
10 g	16.5	13.5	...	...	1	1	5	...
5 g	12.5	10.5	...	...	0.5	1	4	...
2 g	10	8	...	...	...	...	...	...
1 g	7.5	...	...	...	...	...	2.5	...

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent

(2) Other than Bullion Weights. (For supplementing the iron and steel series) Weights of denomination 1 kg and down to and including 1 g shall be flat cylindrical in shape and shall have a distinct downward taper. Shapes and dimensions shall conform to Fig. 6 read with Table 6.

TABLE 6
Dimensions of Flat Cylindrical Weights

Denominations	A	B	C	D	E	F	G	H
1 kg	84.5	58	16	76	4	15	25.5	20
500 g	64	46.5	16	56	3	14	23	23
200 g	50	34.5	13	45	2.5	9.5	15	15
100 g	38	26	11	33.5	2	9.5	13	12
50 g	29	20.5	10	25	2	8	11.5	10
20 g	22	16.5	8	19.5	1	4	8	10
10 g	17.5	12.5	..	16	1	..	6	..
5 g	13	10	..	11.0	1	..	5	..
2 g	10	7.5	..	9	0.5	..	3.5	..
1 g	8	..	..	6.5	..	..	2.5	..

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent.

(c) Loading Holes. — Weights of denominations 20 kg. and down to and including 20 g. shall have a round loading hole, tapering outwards in the centre of the underside (See Fig. 3, 4, 5 and 6).

(d) Permissible Errors. —

Denominations	Verification errors in excess only		Inspection			
			Bullion Weights		Other than Bullion Weights	
	Bullion Weights	Other than Bullion Weights	Excess	Deficiency	Excess	Deficiency
20 kg	mg. 500	..	mg. Error same as in verification	mg. 250	mg. Error same as in verification	mg. ..
10 kg	250	..	..	125	..	..
5 kg	150	..	..	75	..	..
2 kg	80	..	..	40	..	..
1 kg	50	250	..	25	..	..
500 g	30	150	..	15	..	125
200 g	20	100	..	10	..	75
100 g	16	80	..	8	..	50
50 g	12	60	..	6	..	40
20 g	10	50	..	5	..	30
10 g	8	40	..	4	..	25
5 g	6	30	..	3	..	20
2 g	4	20	..	2	..	15
1 g	2	10	..	1	..	10
						5

4. Sheet Metal Weights. — (a) Materials. — Sheet Metal weights shall be made of stainless steel, aluminium, brass or nickel silver sheets.

(b) Shape and dimensions:

(1) Other than Bullion weights. — After bending along one of the sides (see Fig. 7) the weights shall have the dimensions given in Table 7 and the following shapes: —

Denomination	Shape
500,50,5	Hexagon
200,20,2	Square
100,10,1	Triangle

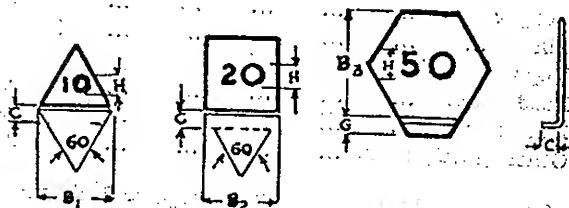


Fig. 7 — Sheet Metal Weights

TABLE 7
Dimensions of Sheet Metal Weights

Denomination Mg.	B1	B2	B3	H	G
500	..	..	12	4	2
200	..	9.0	..	3.5	2
100	9.0	..	..	3.5	2
50	..	..	9.5	3	1.5
20	..	6.4	..	2.5	1.5
10	6.4	..	..	2	1.5
5	..	..	6.3	2	1
2	..	3.6	..	2	1
1	3.6	..	..	2	1

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent.

(2) Bullion Weights. — When intended for use in the bullion trade, sheet metal weights shall, after bending have circular shapes; their diameters shall be as given in Fig. 8 read with Table 8.

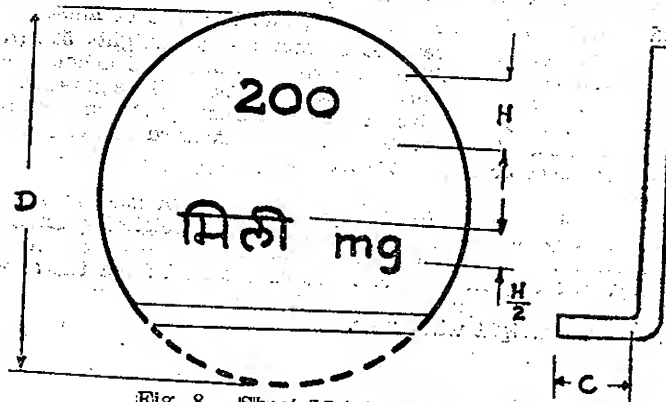


Fig. 8 — Sheet Metal Bullion weight

TABLE 8
Dimensions of Sheet Metal Weights (Bullion)

Denomination	D	C	H
mg			
500	11.0	2	2
200	10.0	2	2
100	9.0	2	2
50	8.0	1.5	2
20	6.3	1.5	2
10	5.6	1.5	1.6
5	5.0	1.0	1.6
2	4.0	1.0	1
1	3.2	1.0	1

All dimensions in millimetres.

Tolerance on dimensions ± 10 per cent.

(c) Permissible errors. —

Denomination	Verification errors in excess only		Inspection			
			Bullion weights		Other than bullion weights	
	Bullion weights	Other than Bullion weights	Excess mg.	Deficiency mg.	Excess mg.	Deficiency mg.
mg.	mg.	mg.				
500	1.6	8.0	Error same as in verification	0.8	Error same as in verification	4.0
200	1.2	6.0	..	0.6	..	3.0
100	0.8	4.0	..	0.4	..	2.0
50	0.4	2.0	..	0.2	..	1.0
20	0.4	2.0	..	0.2	..	1.0
10	0.2	1.0	..	0.1	..	0.5
5	0.2	0.4	..	0.1	..	0.2
2	0.2	0.2	..	0.1	..	0.1
1	0.1	0.1	..	0.05	..	0.05

5. Manufacture and Finish. — General. — When the weights are cast, the castings shall be reasonably smooth, and free from dross, pits, blow holes and other defects. When the weights are made by machining or forging, the surface shall be reasonably smooth. Sheet metal weights shall be clearly sheared and shall be free from burrs. Cast iron and forged weights shall be coated with a thin film of suitable black paint or varnish.

The raised markings on weights shall be clean and legible. The stamped markings on sheet metal weights shall be legible and deep enough to ensure indelibility over a long period, but not so deep as to crack the sheet.

When lead is used in adjusting weights, it shall be so fitted as to ensure that it does not dislodge itself under normal conditions of use.

The steel handles of cast iron weights shall be rigidly fixed.

6. Marking. — Every weight, except weights of 10 g and of lower denominations, shall have the manufacturer's name or trade mark indelibly cast or stamped on it.

The denominations shall be indicated by the abbreviations 'किलो' and 'kg' for kilogram, 'ग्राम' and 'g' for gram and 'मिली' and 'mg' for milligram. The size of numerals and letters (letters need not be stamped on weights 50 mg. and below and on bullion weights with knobs of denominations 5 g and below) indicating denominations of weights shall be at least twice the size of letters indicating the manufacturer's name or trade mark. The numerals used in the denomination shall be only Indo-Arabic figures.

7. Adjustments. — The weight provided with loading holes shall be adjusted by pouring the required weighed quantity of molten lead into the loading hole and pressing the lead firmly. The approximate distance of the lead from the surface shall be not less than 20 per cent of the minimum thickness of the weight when new.

PART II

Commercial carat weights

1. General. — (a) This part prescribes the requirements for commercial metric carat weights intended for use in weighing pearls, diamonds and other precious stones.

(b) For easy calculation and convenience in use, a carat is sub-divided into 100 parts called cents. Thus, a cent equals 2 mg. Fractions of a carat are expressed with 100 as the denominator, the numerator representing the number of cents in the fraction; for example, 0.5 carat is designated as 50/100 carat.

2. Denominations. — (a) The denominations of the carat weight shall be as given below:

(i) Knob Weight

Denomination:

Carat (c)	Equivalent gram (g)
500	100
200	40
100	20
50	10
20	4
10	2
5	1

(ii) Sheet Metal Weights:

Denomination,

Carat (c)	Equivalent mg
2	400
1	200
50/100	100
20/100	40
10/100	20
5/100	10
2/100	4
1/100	2
0.5/100	1

There shall be two weights each of the denominations 2, 20 or 200 and 2/100, 20/100 carats.

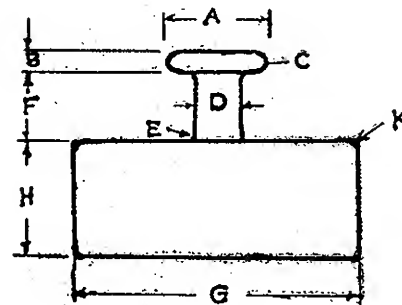
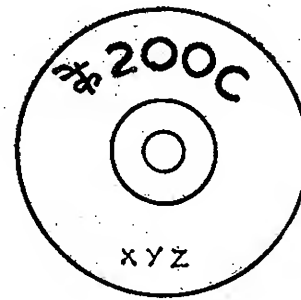


Fig. 9 — Knob Carat Weight

3. Knob Weights. — (a) Material. — The weights shall be made from rolled, drawn or extruded material and shall not be cast. The weights shall be made from brass, bronze, nickel-silver, non-magnetic nickel-chromium or non-magnetic stainless steel.

The weights shall be made from brass, nickel silver, nickel chromium or bronze which may preferable conform to the following: —

(i) Brass — 18: 319 — 1951.

(ii) Nickel silver —

Constituent.	Per cent.
Copper	63.0 to 66.5
Nickel	17.5 to 19.5
Zinc	Remainder
Impurities —	
Iron, max.	0.25
Manganese	0.25
Lead, max.	0.05

(iii) Nickel Chromium —

Constituent.	Per cent.
Carbon, max.	0.10
Manganese, max.	0.50
Chromium	19.0 to 21.0
Silicon, max.	0.80
Copper, max.	0.20
Iron, max.	1.20
Nickel (small amounts of cobalt to be counted as nickel)	Remainder

(iv) Bronze —

Constituent.	Per cent.
Copper	89.0-91.0
Tin	Remainder
Impurities —	
Lead, max.	0.05
Iron, max.	0.05
Other (total) max.	0.13

(b) Shape and dimensions. — The shape and dimensions of the weights shall be as shown in Fig. 9 and Table 9.

TABLE 9
Nominal dimensions of Knob Carat Weights
(All dimensions in mm)

Denomination	A	B	C	D	E	F	G	H	K
Carat (c)									
500	12	2.5	1.25	5.0	1.5	8.0	33.2	13.26	0.40
200	10	2.2	1.10	4.5	1.5	6.5	24.4	9.60	0.30
100	9	2.0	1.00	4.0	1.0	6.0	19.1	7.63	0.30
50	8	1.8	0.90	3.5	1.0	5.5	15.0	5.95	0.25
20	7	1.7	0.85	3.0	1.0	5.0	10.8	4.13	0.25
10	6	1.6	0.80	2.5	1.0	4.5	8.2	3.26	0.20
5	5	1.5	0.75	2.0	1.0	4.0	6.3	2.49	0.20

Note:—The above nominal dimensions are related to a material with a density of 8.4 g/cm³. To take into account variations in materials and manufacturing practices, a tolerance of + 5 per cent is permitted on the dimensions except on C, E and K.

(c) Permissible errors:—

Denomination	Verification	Inspection	
	Errors in excess only	Excess	Deficiency
Carat (c)	mg.	mg.	mg.
500	8.0	Same as on verification	4.0
200	6.0		3.0
100	5.0		2.5
50	4.0		2.0
20	3.0		1.5
10	2.0		1.0
5	1.0		0.5

4. Sheet metal Weights.—(a) Material.—Weights of denominations 2/100 carat and below shall be made of aluminium sheet. Weights of higher denominations shall be made of sheets of brass, aluminium, nickel-silver, nickel-chromium or bronze.

(b) Shape and dimensions.—Sheet metal weights shall be square with a raised corner for easy handling, see Fig. 10. They shall have the dimensions given in Table 10.

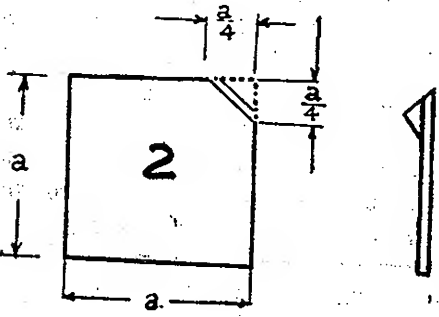


Fig. 10—Sheet Metal Carat Weight

TABLE 10
Nominal dimensions of Sheet Metal Carat Weights

Denomination	Carat (c)	Size (a) mm
2		12
1		10
50/100		9
20/100		8
10/100		7
5/100		6
2/100		5
1/100		4
0.5/100		3

Tolerance +10 per cent.

(c) Permissible errors:—

Denomination	Verification	Inspection	
	Errors in excess only	Excess	Deficiency
Carat (c)	mg.	mg.	mg.
2	0.8	Same as on verification	0.4
1	0.6		0.3
50/100	0.4		0.2
20/100	0.2		0.1
10/100	0.2		0.1
5/100	0.1		0.05
2/100	0.1		0.05
1/100	0.1		0.05
0.5/100	0.1		0.05

5. Manufacture and Finish.—(a) The surface of the weights shall be reasonably smooth. Sheet metal weights shall be smoothly sheared and shall be free from burns.

(b) For better stability and finish, the weights may be nickel-chromium, gold or rhodium-plated.

6. Marking.—(a) Every weight, except weights of 50 carat and lower denominations, shall have the manufacturer's name or trade mark and the denomination indelibly stamped on it.

(i) The denomination shall be marked in the Indo-Arabic numerals prefixed and suffixed by the letters ' ' and 'c' respectively, except that in the case of weights below 50 carat, only the numerals shall be marked. The size of the numerals and letters indicating denominations of weights shall be at least double the size of letters indicating the manufacturer's name or trade marks.

(b) The markings shall be legible and deep enough to ensure indelibility over a long period of use, but not so deep as to crack the weight itself.

7. Packing.—The weights shall be supplied in a suitable velvet lined box. The small sheet metal weight shall be so housed and provided with a cover of glass or any other transparent material that they will not get dislodged from their proper places. The box shall also contain a pair of forceps for manipulating the weights.

PART III

Commercial liquid capacity measures

1. General:—

This Part deals with two types of cylindrical liquid measures, namely the dipping and the pouring types, and one type of conical measures. Cylindrical measures are used for measuring out commodities like milk while conical measures are used for measuring mineral oils.

2. Denominations.—

The denominations of the different types of measures shall be as under:—

Cylindrical measures:

Dipping type	Pouring type	Conical measures
1 l	2 l	20 l
500 ml	1 l	10 l
200 ml	500 ml	5 l
100 ml	200 ml	2 l
50 ml	100 ml	1 l
20 ml	50 ml	500 ml
	20 ml	200 ml
		100 ml

3. Shape and Dimensions:

(a) The shape and dimensions of cylindrical measures (dipping and pouring types) shall be as shown in Figs. 11 and 12 and Table 11.

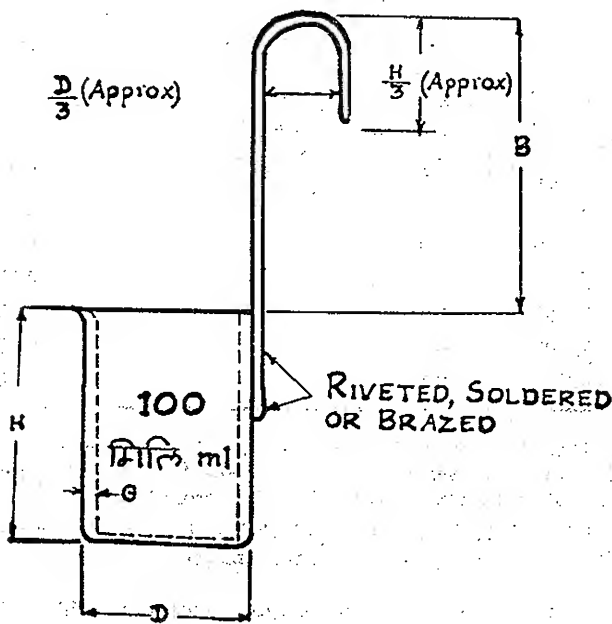


Fig. 11 — Dipping type Cylindrical measure (Schematic)

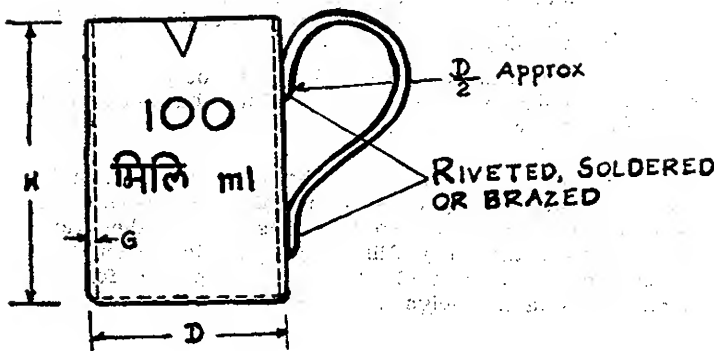


Fig. 12 — Pouring type Cylindrical measure (Schematic)

TABLE 11

Nominal dimensions of Cylindrical capacity measures

Denomination	D	H	Max.	B. mini.	G. n
2 l	120	180	360	250	1.60
1 l	95	142	254	210	1.60
500 ml	75	114	224	160	1.60
200 ml	65.5	83	166	120	1.25
100 ml	44	66	132	100	1.25
50 ml	35	52	104	80	1.25
20 ml	26	38	76	60	1.00

Note 1 — All dimensions in millimetres.

Note 2 — Tolerance on dimensions + 10 per cent.

(b) The shape and dimensions of conical measures shall be as shown in Fig. 13 and Table 12.

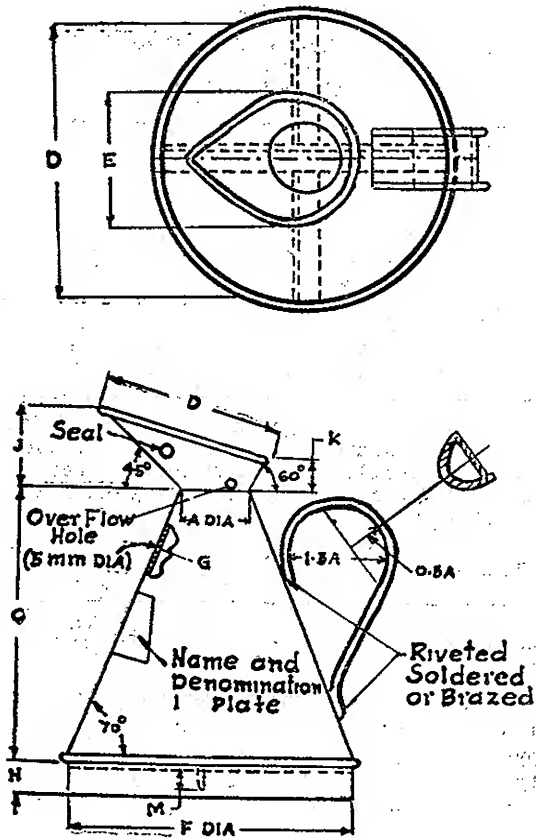


Fig. 13 — Pouring type conical measure (Schematic)

TABLE 12

Nominal dimensions of Conical capacity measures

Denomination	A	B	C	D	E	F	G.min.	H	J	K
20 l	97	388	388	208	194	390	1.00	35	86	29 30
10 l	77	308	307	174	154	309	1.00	30	75	26 25
5 l	61	244	245	147	122	247	0.800	25	65.5	24 20
2 l	45	180	180	118	90	282	0.800	20	56	22 16
1 l	36	145	143	95.5	72	145	0.630	20	45	18 16
500 ml	28	114	113	74	56	115	0.630	15	35	14 12
200 ml	21	84	84	53	42	86	0.630	10	24.5	10 8
100 ml	17	66	67	41	34	69	0.630	10	18.5	7 8

Note 1 — All dimensions in millimetres.

Note 2 — Tolerance on dimensions + 10 per cent except in case of 10 l and 20 l measures for which the tolerance shall be + 5 per cent.

4. Material: —

(a) Cylindrical Measures. — The body of cylindrical measures shall be manufactured in one piece from aluminium alloy sheets, brass sheets or stainless steel sheets. The minimum thickness of the sheets shall be as specified in Table 11. The aluminium alloy sheets and brass sheets may preferably conform to NS. 3 of IS. 737-1955 and Grade 4 of IS. 410-1953 respectively.

(b) Conical Measures. — The conical measures shall be fabricated from galvanised steel sheets, aluminium alloy sheets, copper sheets, brass sheets, stainless steel sheets or tin-plate. The minimum thickness of the sheets shall be as specified in Table 12. The galvanised steel sheets aluminium alloy sheets, brass sheets and tin plates may preferably conform to Class I of IS. 277-1951, NS. 3 of IS. 737-1955 Grade of IS: 410-1953 and Grade I (CI) of IS: 597-1955, respectively.

(c) The handles for the measures shall be fabricated from the same material as that used for the body.

5. Manufacture and finish:

(a) Cylindrical measures made of brass sheets and copper sheets shall be well tinned or tin-plated uniformly all over the inside as well as the outside surfaces. Conical measures made of brass sheets or copper sheets shall be well-tinned or tin-plated uniformly, all over the inside when they are used for measuring commodities like milk, edible oils and such other food articles:

Provided that such measures used for measuring arrack need not be tinned or tin-plated.

(b) The handles shall be of robust construction and shall be well formed and shapped generally as shown in Fig. 11, 12 and 13. They shall be securely fixed to the body by means of rivetting, soldering or brazing.

(c) The measure shall be free from any surface defects and indentation and shall be smoothly finished at the top.

(d) Cylindrical measures shall be provided with a well formed and proportioned spout to facilitate pouring.

(e) Conical measures shall be provided with a retaining lip to avoid spilling. The retaining lip shall be provided with a brass plug with a collar to receive the lead for the Inspector's seal. A small hole about 5mm. in diameter, shall be provided at the bottom of the retaining lip to indicate the level to which the measure shall be filled and the hole shall be located on the side at right angle to the handle. The bottom of conical measures shall be suitably re-inforced.

(f) The measures shall be so designed that, when they are tilted 120 degrees from the vertical, they shall become completely empty;

(g) The finished measures shall have adequate robustness for durability.

Note 1.— Capacity measures when used for measuring milk shall have the handle fixed by welding, soldering or brazing so as not to leave pockets in which dirt may accumulate.

Note 2.— Dipping type cylindrical measures may also have handles substituted by two suitable but diagonally opposite brackets affixed to the body of the measure by means of soldering, brazing or welding so as to hold the measure properly by handle at right angle to the body of the measure to facilitate its use in hot and boiled milk trade.

6. Permissible Errors:

Denomination	Verification Errors in excess only		Inspection			
	Cylindrical measures	Conical measures	Cylindrical measures		Conical measures	
			Excess	Deficiency	Excess	Deficiency
	ml	ml	ml	ml	ml	ml
20 l	..	100	Error same as in verification		Error same as in verification	
10 l	..	50				
5 l	..	30				
2 l	..	30				
1 l	20	10		15		7.5
500 ml	15	8		10		5
200 ml	8	4		7.5		4
100 ml	5	3		4		2
50 ml	3	..		2.5		1.5
20 ml	2	..		1.5		..
				1		..

7. Marking:

(a) Every cylindrical measure shall have the denomination and manufacturer's name or trade mark indelibly stamped on it. In the case of conical measures, the denomination and manufacturer's name or trade mark shall be either embossed on the body or indelibly marked on a name plate securely fixed to the body.

(b) The denominations shall be indicated with the abbreviations 'लि' and 'l' for litre; and 'मिलि' and 'ml' for millilitre. The size of numerals and letters indicating denominations on the measures shall be twice the size of the letters indicating the manufacturer's name or trade mark.

PART IV

Special measure for petroleum products

1. General.— This part deals with a special capacity measure which may be used for petroleum products, in addition to the conical measures prescribed in Part III of this schedule. This measure shall not be used for any other commodity.

2. Denomination.— The special measure shall have a capacity of 18.5 litres.

3. Shape and dimension.— The shape and dimensions of the special measure shall be as indicated in figure 14 below:

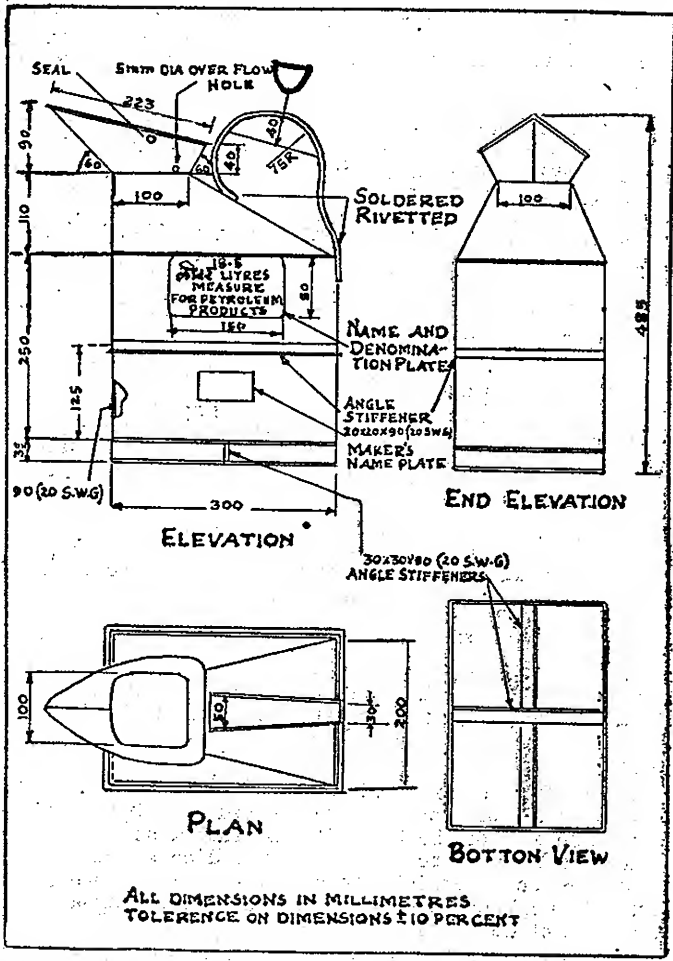


Fig. 14 18.5 Litre measure for petroleum products.

4. Material.— The measure shall be fabricated from galvanised steel sheets, aluminium alloy sheets, copper sheets, brass sheets, stainless steel sheets or tin plate. The minimum thickness of the sheet shall be as indicated in the Figure. The handle shall be fabricated from the same material as that used for the body.

5. Permissible errors.— The maximum permissible error for verification as well as for inspection shall be as follows:—

Verification:	Excess only	100 ml.
Inspection:	Excess	100 ml.
	Deficiency	50 ml.

PART V

Dispensing measures

1. General.— This part deals with two types of dispensing measures made of glass and transparent plastic materials, used for dispensing purposes. Conical dispensing measures of capacity 100 ml may also be used in the sale of liquor.

2. Types and denominations.— Dispensing measures shall be of the following types and denominations:

- (a) Conical Measures-200 ml, 100 ml, 50 ml, 20 ml, 10 ml, 5 ml.
- (b) Beaker Measures-1000 ml and 500 ml.

3. Material.— (a) Glass Measures.— The measures shall be made of clear and transparent glass. They shall be well

annealed; free from stones, cracks and chippings; and as free as possible from blisters and other defects. Lead glass shall not be used for the measures.

(b) Transparent plastic measures. — The measures shall be made of a clear and transparent plastic material, manufactured from plasticised polyvinyl chloride or copolymer, the major constituent of which is polyvinyl chloride. The plastic material used shall not contain any constituents known to be injurious to health and likely to be extracted by contact with liquids.

4. Definition of capacity. — The capacity corresponding to any graduation mark is defined as the volume of water at 27°C expressed in millilitres, required to fill the measure to that graduation mark at 27°C the observer's eye being in level with the front graduation mark and the lowest point of the water meniscus appearing to touch the top edge of that mark.

5. Conical measures. — (a) Shape. — The measures shall be conical as shown in Fig. a to g of fig. 15 and 50 ml measures shall be either tall or squat as shown in Fig. c and d respectively of the said fig. 15.

Fig. a Fig. b Fig. c Fig. d Fig. e Fig. f Fig. g
200 ml 100 ml 50 ml 50 ml 20 ml 10 ml 5 ml

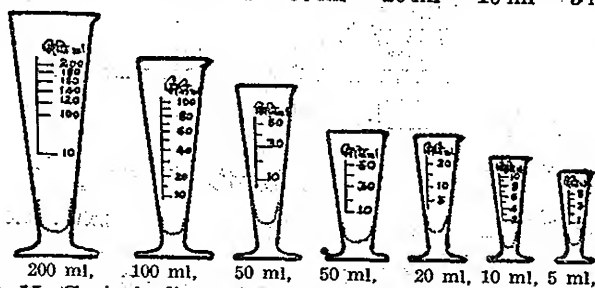


Fig. 15 Conical dispensing Measures of metric series-tall and squat types

(b) Construction. —

(i) Each measure shall have a pouring lip. The form of the lip shall be such that, when the measure is filled with water in the highest graduation mark, the contents may be poured from the lip in a stream falling clear of the outside of the measure.

(ii) Each measure shall have a base on which it shall stand vertically without rocking when placed on a horizontal surface. The size of the base shall be such that the measure, when empty, shall not fall when placed on a plane inclined at 15° to the horizontal. The bottom of the measuring space shall be uniformly rounded and shall merge smoothly into the sides of the measure.

(iii) The wall thickness of the measures shall be sufficient to ensure sturdy construction and shall not show any local departures from uniformity.

(iv) The external surface of the measure shall be a cone having an inclined angle of not less than 13° and not more than 14°.

(v) The overall volume of the measure shall be such that when it is filled with water to the highest graduation mark and a volume of water equal to half its nominal capacity is added to it, there shall be no overflow. But, the addition of a further quantity of water equal to quarter the nominal capacity shall result in water overflowing from the pouring lip.

(c) Graduation. —

(i) The conical measures shall be graduated in accordance with Table 13.

(ii) With the pouring lip of measure facing to the right, the front graduation marks shall be placed at right angles to, and on the right hand side of a vertical line extending from above the top graduation mark to near the base of the measure and below the bottom graduation mark.

(iii) The graduation marks shall be marked as shown in a to g of Fig. 15. The marks shall be engraved or etched and they shall be of a uniform thickness not exceeding 0.3 mm provided that they may taper slightly towards the ends. The graduation marks shall lie in planes perpendicular to the axis of the measure and shall be horizontal when the measure is standing on a horizontal surface.

(iv) Each graduation number shall be etched or engraved close to the end of the graduation mark to which it relates and in such a number that it would be bisected by a prolongation of that graduation mark.

in the form shown in Fig. 16A and 16B.

(v) The numbered graduation marks shall have the minimum length specified in col. 7 of Table 13. The unnumbered graduation marks shall be at least two-third the length of the numbered graduation marks and clearly shorter than the numbered marks.

(vi) The height of the lowest graduation mark above the lowest point of the bottom of the measuring space shall be within the limits given in col. 6 of Table 13.

TABLE 13
Details of Conical Measures

Denomination	Graduated At	Numbered At	Back Lines At	Lowest Graduation Mark	Height of Lowest Graduation Mark Above Bottom of Measuring Space	Minimum Length of Mark
(1)	(2)	(3)	(4)	(5)	(6)	(7)
ml	ml	ml	ml	ml	cm	mm
200	50, 100, 120, 140, 160, 180, 200	50, 100, 120, 140, 160, 180, 200	50, 100, 200	50	6.5±0.5	20.0
100	Every 10 ml from 10 to 100 ml	20, 20, 40, 60, 80, 100	10, 60, 100	10	3.0±0.5	17.5
50 (Tall)	Every 10 ml from 10 to 50 ml	10, 30, 50	30, 50	10	4.0±0.5	15.0
50 (Squat)	Every 10 ml from 10 to 50 ml	10, 30, 50	30, 50	10	2.0±0.5	15.0
20	Every 5 ml from 5 to 20 ml	5, 10, 20	10, 20	5	2.5±0.5	12.5
10	Every ml from 2 to 10 ml	2, 4, 6, 8, 10	2, 6, 10	2	2.5±0.5	10.0
5	Every ml from 1 to 5 ml	1, 3, 5	3, 5	1	2.5±0.5	7.5

(d) Permissible errors. — The permissible errors in capacity shall not exceed the figures given in Table 14 below. The permissible errors in excess or deficiency shall be the same for verification or inspection.

TABLE 14
Permissible errors in capacity of Conical Measures

Capacity corresponding to Graduation Mark ml.	Measures (Except 50 ml Squat)	50 ml (Squat) measures
(1)	(2)	(3)
200, 180, 160	3.0	..
140, 120, 100	2.0	..
90, 80, 70, 60	1.5	..
50, 40	1.0	1.0
30	0.8	1.0
20	0.6	0.8
15	0.5	..
10, 9	0.4	0.6
8, 7, 6	0.3	..
5	0.26	..
4	0.20	..
3	0.16	..
2	0.12	..
1	0.08	..

Note: The permissible errors, apart from those of the 50 ml (squat) measure, apply to graduation marks corresponding to the capacities stated, irrespective of the nominal capacity of the conical measures concerned.

6. Beaker measures. — (a) Shape: The measures shall be

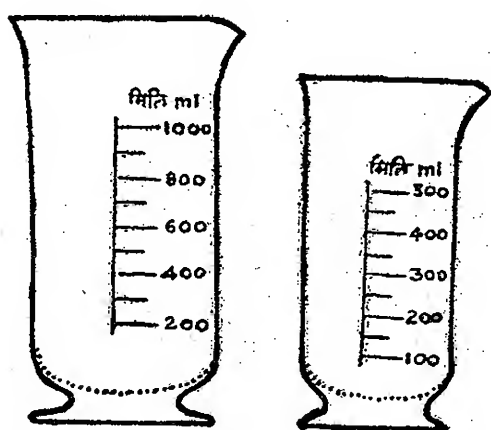


Fig. 16A and 16B—Beaker measures of metric series

(b) Construction.—(i) Each measure shall be provided with a pouring lip. The form of the lip shall be such that, when the measure is filled with water to the highest graduation mark, the contents may be poured from the lip in a stream falling clear of the outside of the measure.

(ii) Each measure shall be provided with a base on which it shall stand vertically without rocking when placed on a horizontal surface. The size of the base shall be such that the measure, when empty, shall not fall when placed on a plane inclined at 15° to the horizontal. The bottom of the measuring space shall be uniformly rounded and shall merge smoothly into the sides of the measure.

(iii) The overall volume of the measure shall be such that when the measure is filled with water to the highest graduation mark and a volume of water equal to quarter the denomination volume is added to it the water shall not overflow.

(c) Graduation.—(i) The graduation marks shall be marked as shown in Fig. 16A and 16B and Table 15. The marks shall be etched or engraved and shall be of a uniform thickness not exceeding 0.3 mm provided that they may taper slightly towards the ends. The graduation marks shall lie in planes perpendicular to the axis of the measure and shall be horizontal when the measure is standing on a horizontal surface.

(ii) Each graduation number shall be etched or engraved close to the end of the graduation mark to which it relates and in such a manner that it would be bisected by a prolongation of that graduation marks.

(iii) The distance between the highest and the lowest graduation marks and the height of the lowest graduation mark above the inside of the base of the measure shall be in accordance with col. (3) and (4) respectively of Table 15.

TABLE 15

Graduation and dimensions of beaker measures

Denomination	Graduation at	Distance between lowest and highest graduation marks	Height of lowest graduation mark above bottom of measuring surface	Diameter of top	Minimum diameter of base	Overall height
(1)	(2)	(3)	(4)	(5)	(6)	(7)
ml		mm	mm	mm	mm	mm
1000	200 to 1000 ml at each 100 ml; numbered at each 200 ml; unnumbered back lines 200, 600 and 1000 ml.	110+10	40+10	120	90	230
500	100 to 500 ml at each 50 ml; numbered at each 100 ml; unnumbered back lines at 100, 300 and 500.	90+5	30+5	100	80	180

*These are only recommendatory.

(d) Permissible errors.—The permissible errors in excess or in deficiency for verification or inspection shall not exceed 7 ml for 1000 ml measure and 5 ml for 500 ml measure.

7. Marking.—Each measure shall have permanently and legibly engraved or etched on it its denomination in Indo-Arabic numerals, the abbreviations 'ml' and 'मिली' being used to indicate millilitres. The manufacturer's name or trade mark shall be marked on the underside of the base of each measure.

PART VI

Special measures for liquor

1. General.—This part deals with special measures which may be used in transactions in liquor.

2. Beaker Measure.—(a) Material.—The measure shall be made of glass.

(b) Denomination and graduation.—It shall be of the denomination of 300 ml. It shall have graduation marks at 100 ml, 120 ml, 150 ml, 180 ml, 200 ml, 250 ml and 300 ml.

(c) Permissible errors.—The permissible errors shall be as follows:—

Graduation Marks	Maximum Permissible Error
100 ml, 120 ml.	+2 ml
150 ml, 180 ml, 200 ml, 250 ml, 300 ml.	+3 ml

3. Peg Measures.—(a) Denominations.—Peg measures may be of the denominations 60 ml and 30 ml.

(b) Permissible errors.—The permissible errors shall be as follows:—

Capacity	Maximum Permissible Error
60 ml	+2 ml
30 ml	+1 ml

PART VII

Commercial length measures

(Non flexible)

1. General.—This part deals with the non-flexible type of commercial length measures made of metal or wood. The metallic measures are generally used for measuring textiles, ribbons and similar materials and wooden measures generally in the timber trade.

2. Denominations.—The denominations of the length measures shall be as follows:—

Metallic measures	Wooden measures
1 m	2 m
0.5 m	1 m
	0.5 m

3. Metallic Measures.—(a) Material.—The measures shall be made from mild steel or brass or from stainless steel. The mild steel rods and brass bars may preferably conform to Designation B of IS:226—1955 and Grade A of IS:319—1951, respectively.

(b) Shape and dimension.—The shape and dimension of the measures shall be as shown in Fig. 17.

(c) Graduation.—(i) The graduation marks shall be made at every cm. or at every cm. for the first ten cm. and thereafter at every five cm. The graduation marks at every ten cm. shall be numbered. The marks at the cm. divisions shall extend over half the breadth and those at five cm. divisions over full breadth of the measures. A cross mark shall be provided at 25 cm. in the case of 0.5 m. measure and at 25, 50 and 75 cm. in the case of 1 m. measure (see Fig. 17).

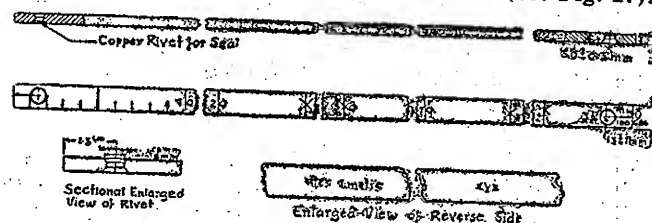


Fig. 17 Metallic Measure

(d) The graduations shall be only on one side of the measure.

(d) Permissible errors:—The mark at every five centimetres shall not exceed or be deficient by more than 0.25 mm and further the error from the beginning of the measure to any line mark shall not exceed 1.0 mm., always provided that the errors on the full length of the measures shall not exceed the following limits:—

Denomination	Verification		Inspection	
	Excess	Deficiency	Excess	Deficiency
1 m	1.0 mm	0.5 mm	1.0 mm	1.0 mm
0.5 m	0.5 mm	0.25 mm	0.5 mm	0.5 mm

(c) Provision for stamping:—The measures shall be provided with a copper rivet near each end (see Fig. 17) firmly fixed in a hole, countersunk on both sides for the Inspector's stamp. An arrow head shall be marked at each end of the measure to provide the points for checking the length.

4. Wooden measures. — (a) Material:—The measures shall be made from well-seasoned timber of any one of the following species:—

- teak (*Tectona grandis* Linn. f.).
- rosewood (*Dalbergia Latifolia* Roxb.).
- shisham (*Dalbergia sissoo* Roxb.).
- haldu (*Adhina cardifolia* Hock. f.).
- bijasal (*Pterocarpus maruspium* Roxb.).
- boxwood (*Buxus sempervirens*).
- beech (*Fagus salvatica*).

(b) Shape and dimensions:—The shape and dimensions of the 2 m, 1 m, and 0.5 m measures shall be as shown in Fig. 18.

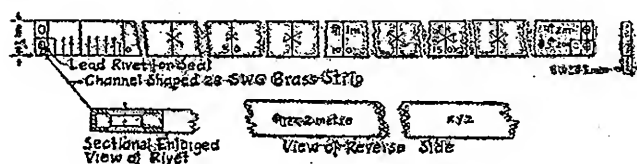


Fig. 18 Wooden Measure

(c) Graduation. — The graduation marks shall be made at every cm or at every cm for the first ten cm and thereafter, at every cm. The graduation marks at every ten cm shall be numbered. The marks at the cm divisions shall extend over half the breadth and those at the five cm divisions over the full breadth of the measures. A cross mark shall be provided at every 25 cm., excluding the one metre and two metre graduations (see Fig. 18).

The graduations shall be on one side of the measures only.

(d) Permissible errors. — The mark at every five cm shall not exceed or be deficient by more than 1 mm and further the error from the beginning of the measure to any line mark shall not exceed 2 mm always provided that the errors on the full length of the measure shall not exceed the following limits:—

Denomination	Verification		Inspection	
	Excess mm	Deficiency mm	Excess mm	Deficiency mm
2	4	2	4	4
1	2	1	2	2
0.5	1	0.5	1	1

(e) Provision for metal tips and stamping. — (i) Each measure shall be provided at each end with a metal tip of 0.9 mm thick brass or copper strip, which shall not be more than 3 cm in width, securely riveted with two rivets at each end as shown in Fig. 18. The width of the tips shall be included in the total length of the measure.

(ii) There shall be two lead rivets at each end as shown in Fig. 18 to receive the Inspector's seal. The rivets which affix the metal strips to the wooden body shall not be shaped to form the lead rivets for receiving the Inspector's seal; the lead rivets shall be separate. The lead rivets shall be 3 mm in diameter.

5. Manufacture and Finish. — (a) The measure shall be evenly finished and shall be reasonably straight.

(b) In the case of metallic measures, the graduation marks and the cross marks shall be legible and deep enough to ensure indelibility over a reasonably long period of use, but not so deep as to make the measures liable to be easily bent. In the case of wooden measures, the markings shall be finished neatly, sharply and legibly, in a colour contrasting with the wood finish. They shall be visible from a distance and shall remain indelible over a reasonably long period of use.

6. Marking. — The denomination shall be stamped on the ungraduated side of the measure at about one-third of the total length from the beginning of the measure and the manufacturer's name or trade mark at a similar distance from the end of the measure. In the case of wooden measures, the markings, shall be finished in the same manner as the graduation.

(ii) In indicating the denominations the numerals shall be preceded by the word 'मीटर' and followed by 'Metre'. The size of numerals and letters, indicating denominations of the measures shall be twice that of the letters indicating the manufacturer's name or trader mark.

PART VIII

Woven metallic tape measures

1. General. — Woven metallic tape measures may be used where the use of rigid measures is not convenient or practicable.

2. Denomination. — The tape measures shall be made in lengths of 2, 5, 10, 15, 20, 30 or 50 metres.

3. Shape and Dimensions. — The shape and dimensions of the measures shall be as shown in Fig. 19A and 19B.

4. Tape. — (a) Material. — (i) The tape shall be of yarn and metal wire in the warp and only yarn in the weft.

(ii) The yarn shall be spun from good quality cotton or linen and shall be either bleached or mercerised. The yarn used shall be of 20 counts (17 French count) in the warp and 40 counts (34 French count) in the weft.

(iii) The wire shall be of prospher bronze copper or stainless steel and shall be 0.16 mm in diameter.

(b) Weave. — (i) The weave shall be either plain, that is one up and one down, or dosuti, that is two up and two down, with at least eight wires uniformly spaced in the warp.

(ii) The total number of warp threads, including wire threads, shall be in the full width of the tape. The picks per cm shall be 16 in the case of cotton yarn and 13 in the place of linen yarn.

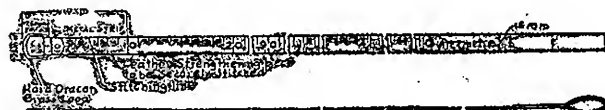


Fig. 19A Woven Metallic Tape Measures 10, 15, 20, 30 and 50 metres.

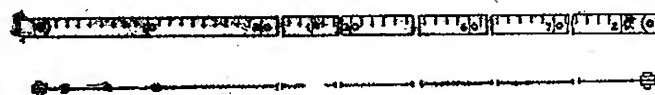


Fig. 19B Woven Metallic Tape Measures-2 and 5 Metres.

5. Manufacture. — (a) The tape shall be coated with a suitable primer of synthetic material over which one or more coats of a flexible, high quality enamel shall be given. The final top coat shall be of a varnish which shall give the tape a good finish. All coatings shall be non-cracking and water resistant.

(b) A metal ring shall be attached to the outer end of tapes of denominations 10, 15, 20, 30 and 50 metres, the ring being fastened to the tape by a metal strip of the same width as the tape for protection and for receiving the Inspector's stamp (see Fig. 19A).

(c) (i) The outer end of tapes of denominations 10, 15, 20, 30 and 50 metres shall be reinforced over a length of not less than 10 cm by a strip of leather or suitable plastic ma-

terial of the same width as the tape. The leather or plastic strip shall also pass around the ring and under the metal strip (see Fig. 19A).

(ii) Tapes of 2 and 5 metres denominations shall be reinforced over a length of not less than 10 cm by a strip of cotton fabric or suitable plastic material, over which a strip of brass or any other suitable material is rigidly fixed for protection and for receiving the Inspector's stamp (see Fig. 19B).

6. Graduations. — (a) The length of the tape shall include the metal finger ring, when provided.

(b) At every cm a black line, 8 to 10 mm in height, shall be drawn and every five cm shall be marked with an arrow in black. Every 10th cm and every metre shall be marked with a black line extending over the full width of the tape (i.e. 16 mm). The graduation marks at every 10th cm and every metre shall be numbered with black and red figures, respectively. The metre markings shall be in addition contain the letters 'मी' and 'm' and the end of the tape shall be marked 'मीटर' and 'metre'. The graduations shall be only on one side of the tapes.

(c) Permissible errors. — The permissible errors in the length of the tape, when supported on a horizontal surface under a tension of one kilogram, shall not exceed the following both during verification and inspection.

Denomination	Permissible Errors
m	mm
2	+ 1.5
5	+ 3.0
10	+ 5.0
15	+ 7.0
20	+10.0
30	+15.0
50	+20.0

In addition, in the case of 20, 30 and 50 metre tapes, the errors from the beginning of the tape to the lengths specified below shall not exceed the following limits: —

Length	Permissible Error
m	mm
10	+10
15	+12.5
20	+15
30	+20

7. Marking. — On the ungraduated side and also on the case of each type, when provided, the name of the manufacturer or his registered trade mark and the denomination shall be legibly marked in English or Devanagari or in both.

Provision for stamping: — Measures shall be stamped on the metal strip at the beginning of the scale on the graduated side.

PART IX

Commercial folding scales

1. General. — This part deals with wooden folding scales.

2. Denominations. — The denominations of the folding scales shall be: 1 m and 0.5 m.

3. Materials. — (a) The scales shall be made from strips or sheets of wood. They shall be uniform in width and thickness throughout the entire length.

(b) The scales shall be made of any one of the following species of timbers: —

- (i) Boxwood (*Buses sempervirens*).
- (ii) Gardenia (*Gardenia* sp.).
- (iii) Parrotia (*Parrotia jacquomontiana*).
Randia Dumororum.
- (iv) Dudhi (*Wrightia* sp.).
- (v) Bamboo.
- (vi) Haldu (*Adina cordifolia* Hook. f.).
- (vii) Kalam (*Mitragyna parvifolia* Korth).

(viii) Kuthan (*Hymenodictyon excelsum* Wall).

(ix) Gamari (*Gmolina arborea* Linn).

(c) The timber shall be thoroughly seasoned and radially sawn. The moisture content of the timber shall be between 8 and 12 per cent. The timber shall be free from knots, cracks, sap wood, shakes and other visible defects such as decay, insect attack etc. and shall be fairly straightgrained.

4. Manufacture. — (a) General: — The scales shall be straight and flat, the edge parallel to each other and the ends square.

(b) No point on any of the edges shall be more than 0.5 mm distant from the straight line connecting its extremities. No point on the surface of scale shall be more than 0.5 mm distant from the plane of the surface.

(c) The scales shall consist of four pieces hinged together and it shall be an end measuring scale. The joints shall work smoothly without undue play and shall be sufficiently free from the folds to be opened and closed without strain. The brass caps shall be closely fitted and strongly secured to the blades. They shall be made flush with the sides of the scales.

5. Dimensions. — (a) The principal dimensions of the scale blanks shall be as follows: —

Length of Graduated part (m)	Overall Length		Width		Thickness
	(max) (mm)	(min) (mm)	(max) (mm)	(min) (mm)	
0.5	500	..	15.0	14.5	4+1
1	1000	..	20.0	19.0	5+1

6. Graduation. — (a) Graduation marks shall be made at every millimetre with a longer line at every 5 mm and cm. The length of the graduation lines shall be as follows:

cm mark	6 mm
5 mm mark	4 mm
1 mm mark	2.5 mm

(b) The lines shall be fine and clear, of uniform depth and thickness, and perpendicular to the edges. The thickness of lines shall be not more than 0.2 mm for stamped scales and 0.1 mm for engine divided scales. The lines shall be of sufficient depth to be legible and indelible.

(c) The lines shall be filled in black on natural background or with a suitable colour which shall contrast with the colour of the base to ensure legibility.

(d) Every cm shall be numbered in Indo-Arabic numerals. The height of the figures shall be between 2.0 and 2.5 mm.

7. Permissible Error. — The cumulative error for the entire graduated part shall not exceed +0.50 mm. Further, over any 10 cm length of scale, the error shall not exceed +0.25 mm.

8. Marking. — (a) The denomination shall be stamped on the ungraduated side of the measure at a distance about one-third of the total length from the beginning of the measure. The manufacturer's name or trade mark shall be marked at the same distance from the end of the measure. The markings shall be finished in the same manner as the graduations.

(b) In indicating the denominations the numerals shall be preceded by the word 'मीटर' and followed by the word 'metre'. The size of numerals and letters, indicating denominations of the measures shall be twice that of the letters indicating the manufacturer's name or trade mark.

9. Provision for stamping. — The measures shall receive the Inspector's stamp either on the metal strip at the ends or the central hinge as may be convenient.

PART X

Steel tape measures

(Winding Type)

1. Denominations. — The tape measure shall be of the denominations 1, 2, 10, 15, 20, 30 and 50 metres.

2. Tape.—a) Tapes shall be of steel or stainless steel and shall be of any of the following widths:

Width mm	Tolerance mm
6.0	+ 0.5
9.5	
13.0	
16.0	

b) The thickness of the tape shall be 0.15, 0.20 or 0.40 mm with a tolerance of + 0.05 mm.

c) The tape shall be of such a quality that when it is wound once round a rod of the diameter indicated below and then released, there shall be no permanent deformation in the tape;

Thickness of Tape mm	Diameter of Rod mm
0.15 and 0.20	12
0.40	25

d) The tapes of 1 m and 2 m shall be flat or curved and tapes of other denominations shall be flat.

e) The edges of the tapes shall be slightly rounded. The tapes shall be well-polished and provided with a rust-proof coating and shall be free from burrs.

f) The outer end of the tapes shall be provided with a ring or other device for facilitating withdrawal. The ring or other device when provided shall be fastened to the tape by a metal strip of the same width as the tape.

3. Graduations.—a) The length of the tape shall include the metal finger ring, when provided.

b) The tapes shall be graduated legibly and indelibly, either by etching or by enamel printing, on one side only.

c) The tapes of denominations 1 m and 2 m shall be graduated throughout at every millimetre. Tapes of denominations 10 m and above shall be graduated at every millimetre the first two decimetres being graduated at every millimetre.

d) The height of graduation for all tapes shall be as follows:

Unit of Graduation	Approximate Height of Graduation for Various Widths of Tape			
	6.0 mm	9.5 mm	13.0 mm	16.0 mm
Millimetre	2	3	4	4
Five millimetres	3	4	6	6
Centimetre	4	5	8	8
Decimetre	Full	Full	Full	Full
Metre	Full	Full	Full	Full

e) Every decimetre and metre shall be marked with Indo Arabic numerals in bold type. The metre graduations at 1 to 9 or preferably the full length shall, in addition, bear the designation or 'मी' and 'm'. After the graduation mark of one metre, every 10 centimetres may be marked with an additional numeral indicating completed metre or metres. The size of this numeral shall be half the size of the numeral indicating centimetres. This numeral of completed metres shall be marked before every numeral of 10 centimetres. The end of the tape, measures shall be marked with the words 'metre' and 'मीटर' or 'metre' (see Fig. 20).

4. Permissible Errors.—a) When checked against a working standard, calibrated at 20°C, the error in the length of the tape, supported on a horizontal surface with a tension of 2 kg. in the case of 10, 15, 20, 30 and 50 metre lengths, shall not exceed the following limits:

(i) The error between any two adjacent millimetre lines, and between contiguous centimetre lines shall not exceed + 0.2 mm, and the error between two contiguous decimetre lines and between two contiguous metre lines shall not exceed + 0.4 mm on any part of the tape; and

(ii) When measured from zero to the points specified below, the error in the length of the tape shall not exceed the following limits:

- 1) 1-metre mark + 0.4 mm
- 2) 2-metre mark + 0.6 mm

- 3) 5-metre mark + 1.0 mm
- 4) Any metre mark beyond the first 5 metres + (1.0 mm for the first 5 metres + 0.5 mm for each additional 5 metres or part thereof).

5. WINDING DEVICE.

a) Automatic Winding Device.

(i) Winding Device. The winding device shall be of substantial construction and shall be such that when the tape is withdrawn by hand to any point up to the limit of its measuring capacity it shall hold at the length withdrawn and shall be capable of being easily rewound.

(ii) Case—The case shall be of corrosion resisting metal, suitable plastic material or of a metal with a non-corrosive finish and shall be not less than 0.50 mm thick. It shall be well-made, smooth finished, with edges and corners rounded off.

b) Hand Winding Device.

(i) Handle—The handle for the winding device shall be suitable for winding the tape on the reel and shall revolve freely without end or side play or stiffness. It shall fold against the reel, and shall have a crank length of not less than 25 mm.

(ii) Reel—The reel, winding drum and its mechanism shall be of robust construction. The reel shall rotate freely. The winding drum of the reel shall be provided with a frictional device suitable for preventing spin of the drum and to reduce to a minimum the back-lash of the tape.

(iii) Case—Tapes of denominations 10, 15, 20, 30 and 50 metres shall be supplied in a case, made of leather or corrosion-resisting metal or a metal with a corrosion-resisting finish fitted with a winding device.

(iv) If it is not wholly made of leather, the case shall be not less than 1.2 mm thick. If the case is wholly made of leather, the thickness of the leather used shall be at least 3 mm.

(v) If metal case is used, it shall be covered with a suitable leather, plastic or leather-cloth.

(vi) The opening in the case for the tape shall be provided with a durable eye and with rollers for bearing on each side of the opening.

c) When the tape is supported at the reel and a 10 kg. load is applied at the free-end for five minutes, the tape shall not get loosened from the reel.

(i) In addition, in the case of tape measures provided with hand-winding arrangement, the following test shall be applied:

Pull out approximately half the length of the tape from the case. Give the tape a short, quick pull by hand, with the case hanging freely, so as to release approximately one metre of the tape. Immediately after movement of the hand has ceased, the reel shall not continue to rotate or oscillate. Rewind the tape to its full limit-within the case and crank; snap the crank handle shut. There shall be no looseness in the reel which will permit any unwinding of the tape'.

6. Marking

a) The tape as well as the case shall be legibly marked with the name or trade-mark of the manufacturer and the denomination in English or English and Devnagri.

7. Provision for Stamping

a) Provision shall be made at the beginning of the tape for affixing the inspector's stamp.



6.0, 9.5, 13.0 or 16.0 mm

Fig. 20—Steel tape measures 10, 15, 20, 30, or 50 metres

PART XI.

Surveying chains

1. General.—This part prescribes the requirements for link type surveying chains of 20 and 30 m lengths for land measurement.

(i) For beam scales of classes C and D, and with capacities .10 kg and below — 54 Rc mini-

(ii) For other weighing instruments — 60 to 66 Rc

(i) The knife-edges and bearings shall be replaceable wherever practicable.

(j) Knife-edges and bearings shall be accurately and firmly secured preferably by shanks and nuts, or by bolts and nuts or by set screws. The knife-edges and bearings shall be protected against corrosion and dirt.

(k) Racks and pinions shall be of suitable hard-wearing material and shall be finished smooth.

(l) In the case of weighing instruments having steel yards, the nib shall remain secure in the notch.

(m) The knife edges shall bear upon practically the whole length of the bearings.

3. Marking. — (a) All weighing machines shall be prominently, legibly and indelibly marked with the maker's name or his registered trade mark, model, capacity and class (wherever applicable).

Note: The manufacturer's name or the registered trade mark shall be such as will not be mistaken for the stamp or the seal of the verification authority.

(b) Weighing instruments shall have inscribed on them their maximum weighing capacity in the following manner:

To weigh t, kg, or g' as appropriate
 टन के लिये, 'किलो के लिये, 'ग्राम के लिये' as appropriate.

(c) All numerals appearing on weighing instruments—beams, steel-yards, dials etc. shall be Indo-Arabic numerals.

4. Sealing. All weighing instruments shall be provided by the manufacturer with a plug or stud of soft metal to receive the stamp or seal of the verification authority. Such plug or stud shall be provided in a conspicuous part of the instrument and shall be made in such a manner as to prevent its removal without obliterating the stamp or seal.

5. Tests. — (a) All weighing instruments shall be tested after they have been properly cleaned, and in the condition of their normal use, wherever practicable. Non-portable weighing instruments shall be tested *in situ* in addition to any other test that may be conducted at the premises of the manufacturer or dealer.

(b) 'Sensitiveness' is the least weight which, when added to or removed from the loading platform or pan when the machine is in equilibrium, will cause an appreciable movement of the indicator from its position of equilibrium.

'Error' is the least weight which, when added or removed, will bring the indicator to the position of poise or equilibrium from its position of imbalance.

(c) Weighing instruments shall be tested for sensitiveness and maximum error.

(i) The greatest error in excess on verification for graduations on the steel yard in the range corresponding to the first half of the capacity shall be not more than half the error allowed at full load; for graduations on the remaining part of the steel-yard, the error shall be not more than the error prescribed at full load.

(ii) The greatest error in excess, on verification in the case of machine fitted with dial shall be half the weight represented by the interval between the consecutive graduation marks.

(iii) The permissible error in respect of graduations on machines fitted both with steel yards and dial shall be as prescribed above in (i) and (ii).

PART II

Beam scales

1. Definitions. — a) Beam Scale—A weighing instrument with equal arms, having three knife-edges, three bearings, an indicator (pointer) in the centre, and pans suspended from the end knife-edges (see Fig. 22).

b) Sensitiveness of a Beam Scale. — A measure of its responsiveness to a small change in load in one of the pans, under specified conditions of loading; this can be expressed as the ratio between the change in mass in one of the pans and the corresponding deflection of the beam (or of the attached pointer) caused by the change.

(i) In the case of the beam scale fitted with a pointer and an indication scale, it is expressed in terms of milligrams per division.

(ii) In the case of a beam scale having no indicating scale, it is expressed as the least weight, required to be added to or removed from one of the pans, which causes an appreciable movement of the pointer from its position of equilibrium under a specified condition of loading.

c) Error (Due to Inequality of Arms) — The error due to inequality of arms of a beam scale is equal to the mass of the additional weights required to bring to equipoise the balance, carrying weights of equal masses in the pans.

d) Greatest Error (Due to Inequality of Arms) — The greatest error due to inequality of arms is the error determined with two weights each equal to the capacity (full load) of the balance.

2. Classes and Capacities. — a) Beam scales shall be of any one of the four classes, namely, A, B, C or D, based on limits for sensitiveness and greatest error specified in Tables 16 to 19, respectively.

b) Beam scales of the different classes shall be of one of the capacities mentioned in Table 16 to 19.

c) The trades for which the different classes of scales may be used are:

Class of scale	Use
A	Commercial assay and in «Dharam Kantas» for verifying the weights of bullion precious stones.
B	Precious stones, jewels, pearls, bullion precious metals, saffron and similar expensive commodities, chemists and druggists preparations, perfumery etc.
C	Base metals and commodities such as cereals, tea, coffee, tobacco, jute, cotton, dry fruits, spices, oil-seeds etc.
D	Weighment of cheaper commodities such as scrap iron, fuel, wood, charcoal, vegetables, etc.

3. Materials. — a) Material for Class A Beam Scales — shall be made of non-magnetic materials only except knife-edges and bearings.

b) Material for Other Classes of Beam Scales — Beams and pans shall be made of stainless steel, mild steel, brass or bronze.

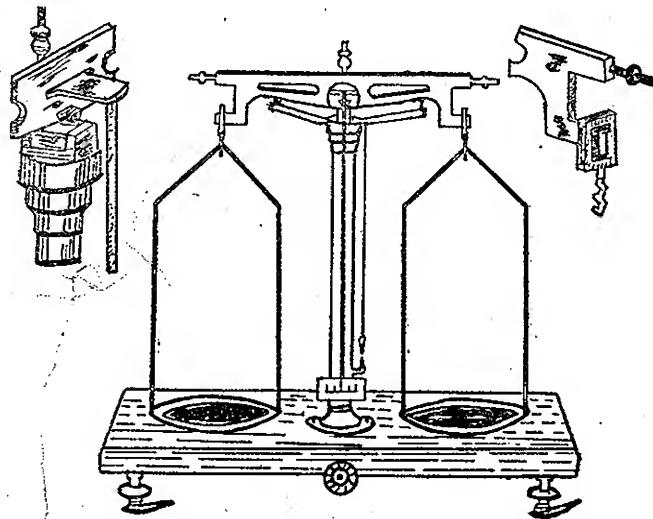


Fig. 22 — Beam Scale

Aluminium alloy may be used in the smaller denomination balances, having a capacity of not more than 50 g. The pans of Class B beam scales may be made of glass also. In the case of beam scales of Classes C and D, pans of hard-wood shall be permitted for capacities 100 kg. and above. The pans of beam scales, when made of timber, shall be adequately reinforced and protected against wear.

c) Suspension — Pans shall be suspended from the beam by metal chains or metal stirrups, except those of 100 g and smaller capacity of Class B beam scales which may be suspended by silk or nylon threads.

d) All mild steel parts used in beam scales shall be suitably protected against rust.

4. Construction. — A) Knife-Edges and Bearings.

(i) The knife-edges and bearings used in beam scales shall be of one of the following types:

- 'Agate-box' — Wherein agate bearings are fitted in a brass or iron box, with side holes which permit the projecting ends of the knife-edges to pass into the boxes and rest on or rise to their bearings (see Fig. 22 (a)).
- 'Dutch-end' — Wherein the end bearings are fixed inside plates bolted together across the beam to form a shackle (see Fig. 22 (b)).
- 'Swan-neck' — Wherein the ends are curved and slotted, the bottom of the slot forming a knife-edge, the extremities of the beam being widened in a direction at right angles to its length so that the base of the slot is parallel to the central knife-edge (see Fig. 22 (c)).
- 'Continuous knife-edge' — Wherein the knife-edges bear along their whole length (see Fig. 22 (d)).

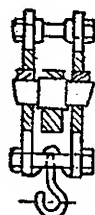
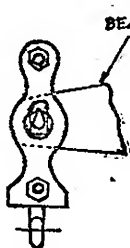
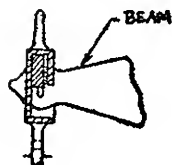


Fig. 22 (a) Agate Box Beam

Fig. 22 (b) Dutch-End Beam

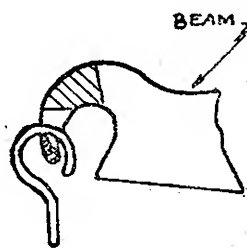


Fig. 22 (c) Swan-Neck Beam

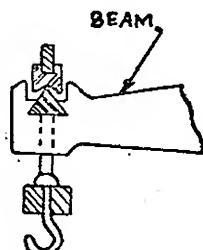
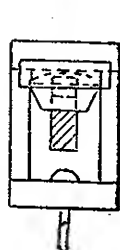


Fig. 22 (d) Continuous Knife-Edge

ii) Class A beam scales shall have continuous knife-edges and shall be provided with means for relieving all the knife-edges from the bearings.

(B) Glass Case — Every beam scale of Class A shall be provided with a glass case. It shall also be provided with bubble or a plumb line and levelling screws to facilitate levelling of the instrument.

C) Leading Dimensions.

i) No dimensions have been specified for Class A beam scales.

ii) Beam scales of Classes B, C and D shall have the leading dimensions specified in Tables 20 to 24 and Fig. 22 (e) to 22 (h) as applicable to within the tolerances specified in 4 (D). For Class C beam scales of capacities 5 kg. and below fixed hooks may also be provided.

Note. — Class D beam scales shall be distinguished from Class C scales by the existence of two identical holes, 5 to 10 mm in diameter through the beam, one on either side of the central knife-edge (see also Fig. 22 (i)).

D) Permissible Variation in Dimensions — The dimensions of the beam scales shall not vary by more than 10 percent of the dimensions prescribed in Tables 21 to 24.

E) Attachment for Adjusting the Balance of a Beam Scale: —

i) Beam scales of Class B having a capacity of 5 kg. and above shall be provided with a balance ball or balance box securely attached to one of the suspension chains or pans in such a manner that it is not possible to alter it easily. The balance ball or balance box shall not be so large as to contain more loose material than an amount exceeding half a percent in weight of the capacity of beam scales under 50 kg. if provided, or an amount exceeding half a kilogram for beam scales of capacity 50 kg and above.

ii) Beam scales of Classes C and D having a capacity of 100 kg and above shall be provided with a balance ball or a balance box securely attached to one of the suspension chains or pans in such a manner that it is not possible to alter it easily. The balance ball or balance box shall not be so large as to contain more loose material than an amount exceeding one percent in weight of the capacity of beam scales under 100 kg, if provided, or an amount exceeding 1 kg for beam scales of capacity 100 kg and above.

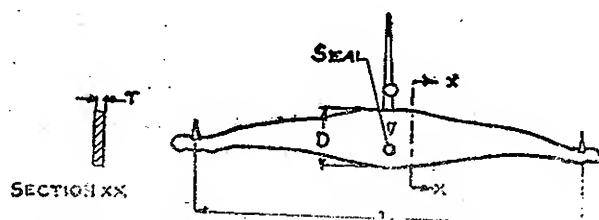


Fig. 22 (e) Beam scale, class B (Flat Type)

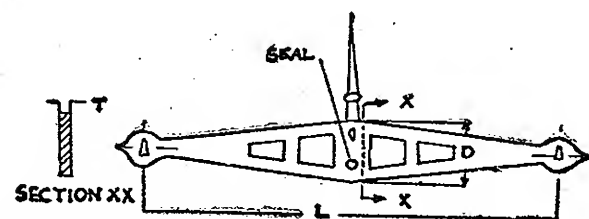


Fig. 22 (f) Beam scale, class B (open pattern type)

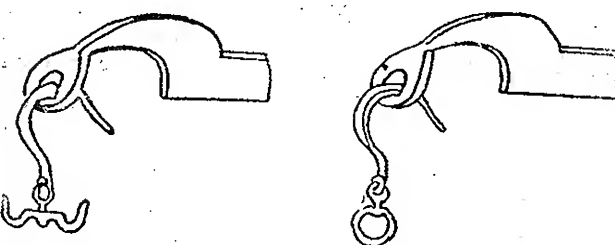
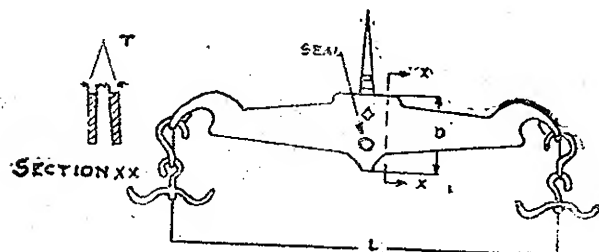


Fig. 22 (g) Beam scale class C (Swan neck with separable flat hooks)

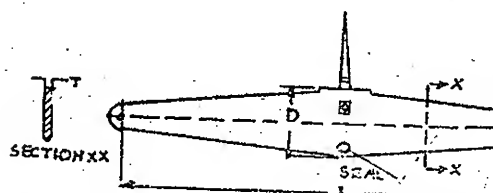


Fig. 22 (h) Beam scale, class C (Dutch)

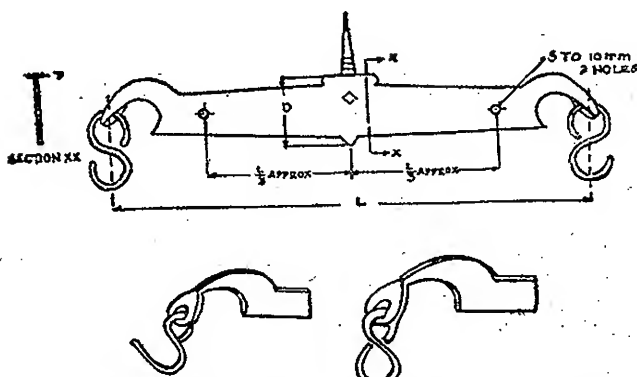


Fig. 22 (i) Beam scale, class D (Swan-neck with fixed flat hooks)

f) Arrangement for Adjusting Sensitiveness — Beam scales other than those of Class A shall not be provided with an achment to adjust their sensitiveness.

5. Tests. — a) Sensitiveness — Class A beam scales shall be tested for sensitiveness at zero and full loads and shall comply with the requirements specified in Table 16. Beam scales other than Class A shall be tested for sensitiveness at full load only and shall comply with the requirements specified in Tables 17 to 19.

(i) Class A Beam Scales — For determining the sensitiveness of a class A beam scale at no load, the beam scale be properly balanced without any load in the pans. A small weight whose mass is accurately known shall be put on one of the pans. This small weight shall be so chosen that the turning points of the pointer remain within the reading index. The rest point shall be determined by the usual oscillation method. The weight shall then be transferred to the other pan and the second rest point shall be determined. The shift of the rest point is a measure of sensitiveness. If this shift is 'n' divisions on the scale and if the mass of the test weight is 'w' mg, the sensitiveness 'S', in milligrams per division, at no load, is given by the relation:

$$S = \frac{2w}{n}$$

Similar test, with appropriate weights in each pan representing the full capacity of the beam scale, shall be performed to determine the sensitiveness of the beam scale at full load.

ii) Class A beam scales 2 g to 20 g — As it is not practicable to make weight of denominations very much smaller than one milligram, the sensitiveness of beam scales of smaller capacities, that is, from 2 g to 20 g, shall be determined by means of a pair of weights, each weight having a mass of approximately 5 mg. The difference in the masses of the two weights in the pair shall be adjusted to be of the order of 0.05 mg, 0.12 mg, 0.25 mg or 0.50 mg depending on the beam scale under test, that is, for testing 2 g, 5 g, 10 g or 20 g beam scale, respectively. This difference should be known accurately. After balancing the beam scale at zero load, one of the two weights in the pair shall be put on the right pan and the other weight on the left pan. The rest point shall be determined. The two weights shall then be interchanged and the second rest point shall be similarly determined. If the rest point shifts by 'n' divisions and if the difference between the masses of the two test weights is 'w' mg, the sensitiveness 'S' of the beam scale in milligrams per division at zero load is given by the relation:

$$S = \frac{2w}{n}$$

To determine the sensitiveness of the beam scale at full load a similar test shall be performed with weights equal to the maximum capacity of the beam scale in each pan.

iii) Beam Scales of Classes Other than A with Pointer Above Beam — Pans of a beam scale other than Class A, shall be loaded with weights representing its full capacity and the scale balanced. Weights of such mass shall then be added on one of the pans as may move the tip of the pointer from its equilibrium position by an appreciable distance. After removing these weights the same test shall be repeated on the other pan and the weights required for moving the tip of the pointer by the same distance on the other side of the equilibrium position shall then be added. If these weights are denoted by 'w1' and 'w2' respectively, the sensitiveness 'S' of the beam scale is given by the relation:

$$S = \frac{w1 + w2}{2n}$$

b) Inequality-of-Arms Test

i) Class A Beam Scale — The error due to inequality of arms of a Class A beam scale shall be determined by loading both the pans with weights made from the same material and representing the full capacity of the scale. The scale shall then be properly balanced by adding small weights. After arresting the beam, the loads including the small weights shall be interchanged and the scale balanced again by putting additional weights on one of the pans. The additional weight, required to balance the scale the second time, shall be equal to twice the error caused by the inequality of the arms of the beam.

ii) Beam Scales Other than Class A — In the case of beam with fixed hooks the beam with hooks but without chains and pans shall be checked for balance. If detachable hooks are provided, the beam alone shall be checked. The loose hooks shall then be attached and the assembly checked for balance. The chains and pans shall then be attached in the case of both the types of balances and checked again for balance.

After checking at no load, each of the pans shall be loaded with weights equal to the marked capacity of the scale and the scale shall be balanced.

The loads thereon shall then be interchanged and the beam scale balanced again by adding necessary weights on one of the pans. The additional weight shall be equal to twice the error due to inequality of arms of the beam.

In the case of beams with attached hooks, the loads shall be inter-changed along with the chains and pans and in the case of beams with detachable hooks the loads shall be inter-changed along with the hooks, chains and pans.

iii) The figure so obtained shall be halved to determine the error at full-load. These should lie within the limits specified in Tables 16 to 19.

e) Shift Test.

i) Class A Beam Scales — The pans of the beam scale shall be loaded with weights representing half its capacity and the scale properly balanced. Shifting the weight in one of the pans gently to different positions on the pan after arresting the beam and releasing again shall not produce any appreciable difference in the balance of the beam scale. Moving the weight on the other pan in a similar manner shall also not produce any appreciable difference in the balance of the beam.

ii) Beam scales other than Class A — With the pans loaded to half the capacity, no appreciable difference in the accuracy of the instrument shall result from moving the knife-edges or bearings laterally or backwards and forwards within their limits of movement.

Similarly, when the above load is moved to any position on the pan, the difference shown shall not be appreciable.

Note. — The words 'appreciable difference' shall mean 'a difference which can be detected', but the Inspector should exercise his discretion in each particular case.

6. Sealing. — a) All weighing instruments shall be provided by the manufacturer with a plug/plugs or stud/studs of soft metal to receive the stamp or seal of the verifying authority. Such plug/plugs or stud/studs shall be provided in a conspicuous part of the instrument and shall be made in such a manner as to prevent its removal without obliterating the seal/seals.

TABLE 16

Limits for sensitiveness and greatest error for beam scale

Capacity	Verification		Inspection	
	Sensiti- veness per division of scale at no load and at full load	Greatest error allow- ed when fully loaded	Sensiti- veness per division of scale at no load and at full load	Greatest error allow- ed when fully loaded
	1	2	3	4
				5
		mg	mg	mg
2 g	0.02	0.04	0.06	0.08
5 g	0.05	0.10	0.15	0.20
10 g	0.10	0.20	0.30	0.40
20 g	0.20	0.40	0.60	0.80
50 g	0.50	1	1.5	2

1	2	3	4	5
	mg.	mg.	mg.	mg.
100 g	1	2	3	4
200 g	2	4	6	8
500 g	5	10	15	20
1 kg	10	20	30	40
2 kg	20	40	60	80
5 kg	30	60	90	120
10 kg	50	100	150	200
20 kg	100	200	300	400
50 kg	200	400	600	800

TABLE 17

Limits for sensitiveness and greatest error for beam scales

Class 'B'

Capacity	Verification		Inspection	
	Sensitiveness at no load and at full load	Greatest error allowed when fully loaded	Sensitiveness at no load and at full load	Greatest error allowed when fully loaded
1	2	3	4	5
2 g	1 mg	2 mg	3 mg	4 mg
5 g	2 mg	4 mg	6 mg	8 mg
10 g	3 mg	6 mg	9 mg	12 mg
20 g	5 mg	10 mg	15 mg	20 mg
50 g	10 mg	20 mg	30 mg	40 mg
100 g	20 mg	40 mg	60 mg	80 mg
200 g	30 mg	60 mg	90 mg	120 mg
500 g	50 mg	100 mg	150 mg	200 mg
1 kg	100 mg	200 mg	300 mg	400 mg
2 kg	200 mg	400 mg	600 mg	800 mg
5 kg	300 mg	600 mg	900 mg	1.2 g
10 kg	500 mg	1 g	1.5 g	2 g
20 kg	1 g	2 g	3 g	4 g
50 kg	2 g	4 g	6 g	8 g
100 kg	5 g	10 g	15 g	20 g
200 kg	10 g	20 g	30 g	40 g

TABLE 18

Limits for sensitiveness and greatest error for beam scales

Class 'C'

Capacity	Verification		Inspection	
	Sensitiveness at no load and at full load	Greatest error allowed when fully loaded	Sensitiveness at no load and at full load	Greatest error allowed when fully loaded
1	2	3	4	5
100 g	100 mg	200 mg	300 mg	400 mg
200 g	200 mg	400 mg	600 mg	800 mg
500 g	500 mg	1 g	1.5 g	2 g
1 kg	1 g	2 g	3 g	4 g
2 kg	2 g	4 g	6 g	8 g
5 kg	3 g	6 g	9 g	12 g
10 kg	5 g	10 g	15 g	20 g
20 kg	10 g	20 g	30 g	40 g
50 kg	15 g	30 g	45 g	60 g
100 kg	25 g	50 g	75 g	100 g
200 kg	50 g	100 g	150 g	200 g
300 kg	75 g	150 g	225 g	300 g
500 kg	100 g	200 g	300 g	400 g
1000 kg	150 g	300 g	450 g	600 g

TABLE 19

Limits for sensitiveness and greatest error for beam scales

Class 'D'

Capacity	Verification		Inspection	
	Sensitiveness at no load and at full load	Greatest error allowed when fully loaded	Sensitiveness at no load and at full load	Greatest error allowed when fully loaded
1	2	3	4	5
1 kg	1 g	2 g	3 g	4 g
2 kg	2 g	4 g	6 g	8 g
5 kg	5 g	10 g	15 g	20 g
10 kg	10 g	20 g	30 g	40 g
20 kg	20 g	40 g	60 g	80 g
50 kg	30 g	60 g	90 g	120 g
100 kg	50 g	100 g	150 g	200 g
200 kg	100 g	200 g	300 g	400 g
300 kg	150 g	300 g	450 g	600 g
500 kg	200 g	400 g	600 g	800 g
1000 kg	300 g	600 g	900 g	1200 g

TABLE 20

Leading dimensions of beam, class-B (with pointer above the beam)

Capacity	Length between the ends (Nominal)	Depth at the Centre (Nominal)	Thickness of Plate at the Centre (Nominal)
	L	D	T
1	2	3	4

Flat Type

2 g	70 mm	10 mm	2 mm
5 g	95 mm	12 mm	2 mm
10 g	110 mm	15 mm	2 mm
20 g	120 mm	20 mm	3.15 mm
50 g	135 mm	22 mm	3.15 mm
100 g	150 mm	25 mm	4 mm
200 g	170 mm	25 mm	5 mm
500 g	200 mm	30 mm	5 mm
1 kg	250 mm	40 mm	6 mm
2 kg	300 mm	45 mm	6 mm
5 kg	450 mm	50 mm	6 mm
10 kg	500 mm	58 mm	8 mm
20 kg	600 mm	58 mm	10 mm
50 kg	750 mm	100 mm	15 mm
100 kg	1000 mm	110 mm	18 mm
200 kg	1250 mm	125 mm	25 mm

Open Pattern (Bridge) Type

200 g	170 mm	25 mm	5 mm
500 g	260 mm	37 mm	5 mm
1 kg	310 mm	44 mm	5 mm
2 kg	350 mm	48 mm	5 mm
5 kg	450 mm	60 mm	6 mm
10 kg	500 mm	70 mm	8 mm
20 kg	600 mm	80 mm	10 mm
50 kg	750 mm	120 mm	15 mm
100 kg	1000 mm	150 mm	20 mm

TABLE 21

Leading dimensions of beam, class B (flat and open pattern type with pointer below the beam)

Capacity	Length between the ends (Nominal) L	Depth at the Centre (Nominal) D	Thickness of Plate at the Centre Knife-Edge (Nominal) T
1	2	3	4
	mm	mm	mm
2 g	70	3	2
5 g	95	3	2
10 g	110	4	2
20 g	120	20	3.15
50 g	135	20	3.15
100 g	150	20	4
200 g	200	20	6
500 g	235	25	8
1 kg	300	30	8
2 kg	320	30	8
5 kg	350	32	10
10 kg	400	40	12
20 kg	500	50	14
50 kg	700	70	18
100 kg	800	80	20
200 kg	1250	125	25

TABLE 22

Leading dimensions of beam, class C (swan-neck type)

Capacity	Length between the ends (Nominal) L	Depth at the Centre (Nominal) D	Thickness of Plate at the Centre Knife-Edge (Nominal) T
1	2	3	4
	mm	mm	mm
100 g	150	30	4
200 g	200	40	5
500 g	300	40	6
1 kg	350	45	6
2 kg	400	45	6
5 kg	550	70	6
10 kg	600	80	6
20 kg	750	108	8
50 kg	900	116	8
100 kg	1200	138	14
200 kg	1350	148	16
300 kg	1650	154	18
500 kg	1800	178	25
1000 kg	2000	200	32

TABLE 23

Leading dimensions of beam, class C (dutch-end type)

Capacity	Length between the ends Knife-Edge (Nominal) L	Depth at the Centre (Nominal) D	Thickness of Plate at the Centre Knife-Edge (Nominal) T
1	2	3	4
	mm	mm	mm
100 g	150	35	4
200 g	200	40	5
500 g	300	40	6
1 kg	350	45	6
2 kg	400	45	6
5 kg	450	70	6
10 kg	450	75	8
20 kg	600	75	8
50 kg	750	80	8
100 kg	900	120	14
200 kg	900	133	16
300 kg	1050	142	16
500 kg	1350	192	20
1000 kg	1650	203	25

TABLE 24

Leading dimensions of beam class D

Capacity	Length between the ends Knife-Edge (Nominal) L	Depth at the Centre (Nominal) D	Thickness of Plate at the Centre (Nominal) T
1	2	3	4
kg	mm	mm	mm
Swan-Neck with Fixed Flat Hooks			
1	350	45	6
2	400	45	6
5	550	70	6
10	600	80	6
20	750	108	6
50	900	116	8
100	1200	138	14
200	1350	148	16
300	1650	154	18
With Detachable Flat Hooks			
500	1800	178	25
1000	2000	200	32

PART III

Counter machines

1. Definition.

1.1. A 'counter machine' is an equal armed weighing instrument of capacity not exceeding 50 kg. the pans of which are above the beam. The figure below illustrates a typical counter machine:

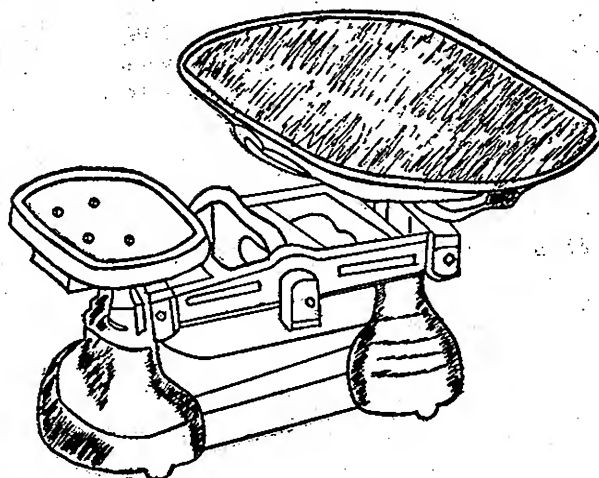


Fig. 23 — Counter Machine

2. Capacities.

The machines may be of the following maximum capacities: 500 g, 1 kg, 2 kg, 3 kg, 5kg, 10 kg, 15 kg, 20 kg, 25 kg, and 50 kg.

3. General requirements. — (a) When the beam or body has two sides, they shall be connected together by not less than two cross-bars. The supports for the pans shall be of a suitable rigid structure such as cross members strengthened by straps. Central pieces of forks shall be fixed so that they are not twisted or dis-located.

(b) Bearing surfaces, knife-edges and points of contact of all stays, hooks and loops shall be hard steel or agate. The knife-edges and bearings shall be so fitted as to allow the beam to move freely. The knife-edges shall rest upon the bearings along the whole length of their working part.

(c) A counter machine may have a balance box for minor adjustments. In such a case, the balance box shall be permanently fixed beneath the weight pan and shall be large enough to contain loose material to an amount up to one per cent of the capacity of the machine. No other adjusting contrivance shall be used.

(d) The pans may be of any suitable material such as mild steel, stainless steel, brass or bronze. They may be of any convenient shape.

(e) The minimum fall either way, on counter machines shall be as follows:—

Capacity	Fall
500 g, 1 kg and 2 kg	6 mm
3 kg, 5 kg, 10 kg & 15 kg	10 mm
20 kg & 25 kg	12 mm
50 kg	13 mm

4. Tests.

(a) The machines shall be tested on a horizontal level plane.

(b) Sensitiveness and error:— (i) The machine shall be tested for sensitiveness at full load with the beam in horizontal position. The addition of the weights specified in columns 2 or 4, as the case may be in the Table below shall cause the pointer to rise or fall to the limit or its range of movement.

(ii) The error is the weight, if any, required to bring the beam of the instrument to a horizontal position when fully loaded with weights equal to its capacity on both pans. It shall not exceed the limits specified in Cols. 3 and 5 as the case may be of the Table 25.

(c) The test for sensitiveness shall be carried out only with the pans loaded to the full capacity of the machine.

(d) When the goods pan is in the form of a scoop, the machine shall be correct to the prescribed limits of error if half the full load is placed against the middle of the back of the scoop and the other half at any position on the scoop.

(e) When the goods pan is not in the form of a scoop, the counter machines shall indicate the same weight within half the prescribed limits of error, if the centre of a load equal to half the capacity is placed on the goods pan anywhere within a distance from the centre equal to one-third of the greatest length of the pan, or if the pan has a vertical side against the middle of that side the weight being entirely on the weight pan, but in any position on it.

TABLE 25

Sensitiveness and errors for counter machines

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded	Sensitiveness when fully loaded	Greatest error allowed when fully loaded
	g	g	g	g
1	2	3	4	5
500 g	1.5	2.2	4.5	4.5
1 kg	2.0	3.0	6.0	6.0
2 kg	3.0	4.5	9.0	9.0
3 kg	4.0	6.0	12.0	12.0
5 kg	6.0	9.0	18.0	18.0
10 kg	7.0	10.5	21.0	21.0
15 kg	8.0	12.0	24.0	24.0
20 kg	9.0	13.5	27.0	27.0
25 kg	10.0	15.0	30.0	30.0
50 kg	15.0	30.0	45.0	60.0

5. Stamping.— Each machine shall be provided with a plug or stud of soft metal on a conspicuous part of the beam or body for receiving the Inspector's stamp. Such a plug or stud shall be made irremovable by undercutting it or by some suitable method.

PART IV

Steel yards

1. Definition.— A 'steelyard' means an unequal armed balance.

2. Capacities.— Steelyards may be of the following capacities:— 5 kg, 10 kg, 20 kg, 50 kg, 100 kg, 150 kg, 200 kg, 250 kg, 300 kg, 500 kg, and 1,000 kg.

3. Design and construction.— (a) The general design of the steelyard shall be as given in the figure below:

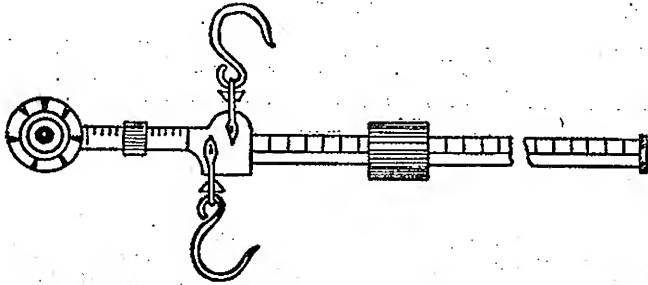


Fig. 24 — Steelyards

(b) Steelyards shall be made of either mild steel or stainless steel.

(c) The shank shall be perfectly straight but its cross section need not necessarily be uniform throughout. Notches or graduations on the shank shall be out in one plane and at right angles to the shank.

(d) The design of the sliding poise shall be such that the nib remains secure in the notch.

(e) Steelyards shall be provided with a stop or other suitable arrangement to prevent excessive oscillation of the shank.

(f) The sliding poise and suspending hooks shall be securely attached to the instrument. All end-fittings, such as the nut attached to prevent the poise carrier riding off the steelyard, shall be securely fixed to the shank. The sliding poise shall be freely movable and there shall be a stop to prevent it from travelling behind the zero mark. Steelyards having a counterpoise or travelling poise shall be provided with a hole or other suitable means for the future adjustment of the counterpoise or travelling poise, such hole being undercut. Wherever loose material is used in the travelling poise, it shall be securely enclosed.

(g) Steelyards shall be neither reversible nor have three hooks and shall not be of countertype.

(h) Steelyards shall be provided with a vertical pointer directly above the fulcrum to indicate the true equilibrium.

(i) If a movable hook, tray, or bucket is used, it shall form an essential part of the steelyard without which it is not possible to balance the steelyard.

4. Tests.— (a) Steelyards shall be tested at full load for sensitiveness and error, and shall comply with the requirements specified in the Table 26.

(i) The test for sensitiveness shall be carried out at full load with the steelyard in horizontal position. The addition of the weight specified in column (2) or (4) of the Table shall make the steelyard turn.

(ii) The error or the weight if any, required to bring the steelyard to a horizontal position when fully loaded shall not exceed the limits specified.

(b) Each numbered graduation shall be tested and the instrument shall be correct whether the test is carried out with increasing or decreasing loads.

(c) The intermediate graduation shall also be tested to see that they are correct and are at proper distance apart.

(d) No test or sensitiveness at a lower load shall be made.

TABLE 26

Sensitiveness and errors for steelyards

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded	Sensitiveness when fully loaded	Greatest error allowed in excess or deficiency when fully loaded
kg.	g	g	g	g
5	2.5	3.8	7.5	7.5
10	5	7.5	15	15
20	10	15	30	30
50	25	50	75	100
100	40	80	120	160
150	60	120	180	240
200	80	160	240	320
250	100	200	300	400
300	120	240	360	480
500	200	400	600	800
1000	400	800	1200	1600

5. Stamping.— Each instrument shall be provided with a plug or stud of soft metal on the front face of the shoulder of the steelyard for receiving the stamp of the verification authority. Such a plug or stud shall be made irremovable by undercutting or by some other suitable method.

PART V

Platform weighing machines

1. Definition.— (a) A «platform weighing machine» means a weighing instrument with compound levers and with the goods receptacle generally in the form of a platform. The capacity of these machines shall not exceed 3 tonnes and the weight of the load is indicated with steelyard or other form of indicator.

(b) The nomenclature of a platform weighing machine is given in Fig. 25 which shows a «loose-weight» type machine. In the case of no loose-weight type machine there are two sliding poises, one for the major bar and the other for the minor bar of the steelyard.

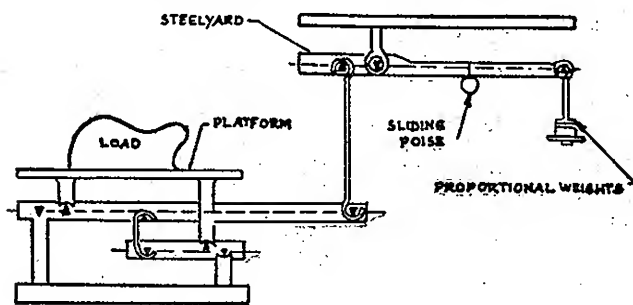


Fig. 25 — Platform weighing machine.

2. Capacities.— Platform weighing machines may be of the following capacities: 50 kg, 100 kg, 150 kg, 200 kg, 250 kg, 300 kg, 500 kg, 1000 kg, 1500 kg, 2000 kg and 3000 kg.

3. General requirements.— (a) Steelyard.— (i) The steelyard in the platform weighing machine shall not have any readily removable part except the support for proportional weights. There shall be one or more stops to prevent the sliding poise or poises from travelling behind the zero mark. The minimum travel of a steelyard in platform machines shall be 10 mm either way.

(ii) The top and bottom of the guide and/or steelyard shall be fitted with non-magnetic material.

(iii) When the steelyard is provided with notches, these shall be suitably protected.

(iv) The value of the smallest division on the minor bar shall not exceed the greatest error allowed for that capacity except for machines for capacities 200 kg and below in which case the value of the smallest division may exceed error prescribed for that capacity but shall not exceed 100 g.

(v) The value of the smallest graduation on dials or minor steelyards, and wherever possible major steelyards shall be 1 g, 2 g, 5 g or any multiple by 10 or any power of 10 (for instance 100, 1000 etc.) of any of these weights.

(b) Platform.— (i) The permissible extension of the platform on either side of the box in the case of extended platform shall be not more than 25 per cent of the length of the box.

(ii) If a movable hutch, barrow, frame or bucket is used with the ordinary platform, it shall form an essential part of the machine without which it is not possible to balance the machine. The movable hutch, barrow, frame or bucket shall be identified with the machine and when in position on the platform, it shall be as central as possible.

(c) Balancing Arrangement.— (i) Where a balanced box provided on the steelyard, the balancing ball shall not be easily accessible.

(ii) The balancing arrangement for daily wear and tear shall have a range not exceeding 0.5 per cent of the capacity of the machine and not less than 0.125 per cent of the capacity each way (see Table 27). The balance box containing the balancing ball shall be securely attached to the steelyard, preferably by passing a bolt through the casing to the steelyard. The balancing ball shall be actuated by a detachable key.

(d) In the case of Platform machines provided with dials.— (i) the racks and pinions shall be of suitable hard wearing material and shall be finished smooth;

(ii) the extremity of the pointer shall, in no position, be at a greater distance than 5 mm from the graduated surface

of the dial. Further, the extremity of the pointer shall be on the graduated portion of the dial, and it shall be so made as not to obscure the graduations or make them difficult to read; and

(iii) the dial shall be graduated into equal parts and the minimum width between the graduations shall be not less than 2 mm.

(e) The machine may, if required, have arrangement for making up the tare.

(f) For machines without proportional weights, the total capacity shall be that indicated on the major steelyard.

4. Proportional weights.— (a) All loose proportional weights in a platform machine shall be identified with the machine by a number or any other suitable mark of identification, which shall be indelible. They shall be marked with their equivalent weights as indicated in Fig. 26.

(b) The proportional weights shall be hexagonal in shape with a slot of a suitable size to allow them being placed on the counter-balance (see Fig. 26).

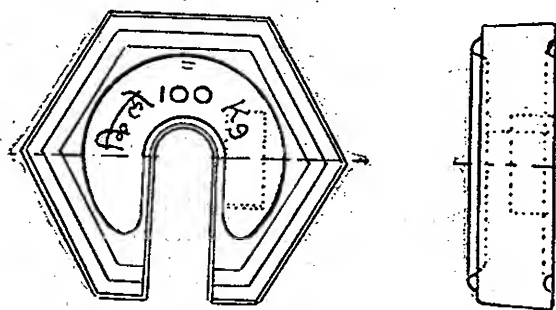


Fig. 26 — Proportional Weight

(c) The proportional weights shall be made of cast iron or brass.

(d) The proportional weights shall have one rectangular loading hole which shall be undercut or tapering outwards so as to hold lead securely for adjustments. The undercut hole shall be reasonably large to accommodate the lead required for adjustments. The surface of the lead in the loading hole of a new proportional weight shall be at least 3 mm inside from the bottom surface of the weight.

(e) In the case of platform machines provided with proportional weights, the smallest denomination of the proportional weights shall be equivalent to the weights represented by the maximum graduation on the steelyard.

(f) The denomination of the proportional weights shall be 1 kg, 2 kg, 5 kg, or a multiple or sub-multiple by 10 or a power of 10 (100, 1000 etc.) of any of these weights. Any number of proportional weights in any one of the aforesaid denominations may be included provided the total of all the proportional weight does not exceed the capacity of the weighing instrument.

Note:— While arriving at the capacity of the platform machines the maximum graduation shown on the steelyard in the case of (looseweights) platform machines and on the minor bar in the case of 'nolose weight' type machines shall not be taken into account.

(g) The total capacity of the machines shall include the capacity of graduated tare bar or bars wherever provided.

Note:— When tare bars are used and are not graduated except with a zero mark only, they shall not be taken into account when calculating the capacity of the machines. Un-graduated tare bars shall be marked with zero.

5. Tests and test requirements.— (a) The steelyard of a platform weighing machine shall remain horizontal at no-load.

(b) Platform weighing machines shall be tested to verify the accuracy of graduations or notches upto the total capacity.

(c) All loose proportional weights, where these are provided, shall be tested and then suitably sealed to prevent tampering.

(d) With one quarter of the maximum load (or as near thereto as practicable) placed in the middle or at any of the corners of the platform, the platform weighing machine shall show the correct weight within half the limits of error prescribed in Table 28 in col. 3 for non-dial type machines and Col. 4 for dial type machines.

(e) Platform weighing machines with steelyard arrangement shall be tested for sensitiveness and error at full load

or as near to it as practicable. The sensitiveness and permissible error shall not exceed the limits prescribed in col. 2 and 3 respectively of Table 28.

(f) The machines shall be tested at loads corresponding to the major divisions or notches.

(g) With the exception of sensitiveness test (see 'e' above), the other tests mentioned above shall be carried out in a similar manner on dial type machines also. These machines shall comply with the requirements prescribed in col. 4 of Table 28.

6. Stamping. — (a) Platform machines of the dial type shall be fitted with a soft-metal plug for receiving the stamp of the verification authority and wherever practicable, this plug shall be passed through the dial and frame. The plug or stud fitted on the dial shall be so supported as to prevent the risk of any damage to the instrument.

(b) On platform machines other than those of the dial type, a plug or stud shall be provided in a conspicuous position on the indicating lever or steelyard.

TABLE 27
Range of balancing arrangements

Capacity (1)	Range of balancing arrangement	
	Maximum 0.5 per cent of capacity each way (2)	Minimum 0.125 per cent of capacity each way (3)
kg.		
50	250 g.	60 g.
100	500 g.	125 g.
150	750 g.	185 g.
200	1.0 kg.	250 g.
250	1.3 kg.	310 g.
300	1.5 kg.	350 g.
500	2.5 kg.	625 g.
1000	5.0 kg.	1.25 kg.
1500	7.5 kg.	1.88 kg.
2000	10.0 kg.	2.50 kg.
3000	15.0 kg.	3.25 kg.

TABLE 28
Sensitiveness and errors for platform machines

Capacity	Verification			Inspection		
	Greatest error allowed in excess or in deficiency when fully loaded for			Greatest error allowed in excess or in deficiency when fully loaded for		
	Sensitiveness when fully loaded	Non-dial type machines	Platform machines fitted with dials	Sensitiveness when fully loaded	Non-dial type machines	Platform machines fitted with dials
kg.	g.	g.		g.	g.	
50	10	20	A weight corresponding to one half the interval between consecutive graduations.	30	40	A weight corresponding to the interval between consecutive graduations.
100	20	40		60	80	
150	30	60		90	120	
200	40	80		120	160	
250	50	100		150	200	
300	60	120		180	240	
500	100	200		300	400	
1000	125	250		375	500	
1500	200	400		600	800	
2000	250	500		750	1000	
3000	300	1000		900	2000	

PART VI
Spring balances

1. Definition. — (a) A «Spring balance» is an instrument which, on the application of the load to be weighed, indicates the whole weight by the extension or compression of a spring, such extension or compression being registered by means of a pointer on a dial.

(b) The general arrangement of the spring balance without scoop and support is illustrated in the fig. below:

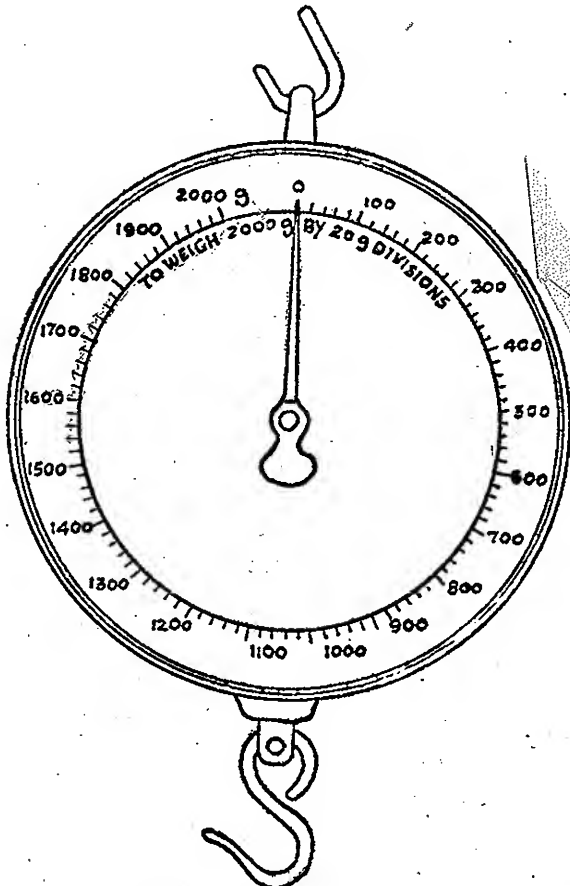


Fig. 27 — Spring balance.

2. Capacities. — The spring balance shall be of one of the capacities shown in the Table 29.

3. General requirements. — (a) In addition to the general requirements specified in part I of this Schedule a spring balance shall comply with the requirements given below:

(b) The spring balance with the goods pan below the spring shall be suspended permanently from a stand, support or bracket.

(c) If pans are provided for the balance, they shall be made of brass, bronze, cast iron, mildsteel or stainless steel. Metal chains or metal supports shall be provided if pans are suspended. When mild steel is used, it shall be suitably protected against corrosion.

(d) The extremity of the pointer shall not exceed 1.0 mm in width and shall not be more than 3.0 mm away from the graduation on the dial.

(e) The dial shall be graduated into equal parts, and the width apart of the graduations shall be not less than 2 mm.

(f) The weight corresponding to the interval between consecutive graduation marks shall not exceed the values given in the Table 29.

(g) When the graduation commences at a fixed load, the position of the index, when there is no load, shall be clearly indicated by a zero mark.

(h) When a spring balance is provided with an adjustable indicator, the range of adjustment shall not exceed one per cent of the capacity of the instrument, except in the case of instruments used for mixing purposes where it shall not exceed two per cent.

(i) Spring balances shall have a device incorporated in the design to prevent overloading.

(j) The body of the spring balances shall be constructed of brass, cast iron, mild steel or any other suitable material, and shall be sufficiently robust in construction.

4. Tests. — (a) When the pan is below the spring, the prescribed limits of error shall not be exceeded, wherever the load is placed on it.

(b) If the pan is in the form of a scoop and half the full load is placed at the farthest point from the centre of the scoop and the other half at any position, the spring balance shall be correct to the prescribed limits of error.

(c) When the pan is not in the form of a scoop, the spring balance shall indicate the correct weight within half the prescribed limits of error, if the centre of a load equal to half the capacity is placed on the pan anywhere within a

distance from the centre equal to one third of the greatest length of the pan, or if that pan has a vertical side against the middle of that side, the weight being entirely on the weight pan.

(d) Each graduation shall be tested.

(e) The instrument shall be correct whether the test is made by progressively increasing or decreasing the loads, provided that in either case the spring shall be allowed to vibrate before the reading is taken.

(f) The balance shall be loaded to its capacity, and the load maintained for a period of 24 hours after which it shall be removed. Four hours after removal of the load, the balance shall not show any permanent set. Further, when tested as stated in (e) above, it shall record correct readings.

(g) Spring balance shall not be tested for sensitiveness.

5. Stamping. — Spring balances shall be fitted with a soft plug to receive Inspector's stamp and wherever practicable, this plug shall pass through the dial or frame. The plug or stud shall be so supported as to allow no risk or injury to the instrument.

TABLE 29

Maximum error for spring balances

Capacity	Maximum weight corresponding to interval between consecutive graduations	Maximum error	Remarks
(1)	(2)	(3)	(4)
1 kg	5 g	Weight correspond-	While fixing the dia-
2 kg	20 g	ing to 25 per cent	meter of effective
5 kg	20 g	of the interval be-	circle on dial of
10 kg	50 g	tween successive	one revolution a
15 kg	50 g	graduati-	blank space of
20 kg	100 g	ons. A weight corres-	15 mm at the end
30 kg	100 g	ponding to 50 per	of graduations has
50 kg	200 g	cent of the in-	to be provided. In
100 kg	500 g	terval between	the case of multi-
150 kg	1.0 kg	successive gradua-	revolution spring
200 kg	1.0 kg	tions.	balances the mini-
300 kg	1.0 kg		mum blank space
500 kg	2.0 kg		requirement shall
			not apply.

Note: — Inspection tolerances shall be double the values shown in Col. 3.

PART VII Weighbridges

1. Definition. — A "weigh bridge" means a weighing instrument constructed with compound levers, with the indicator system carried on foundations separate from the lever system to weigh loads of capacities 1000 kg (one tonne) and over, through the medium of proportional weights or indicating mechanism. A typical weigh-bridge is illustrated in fig. 28.

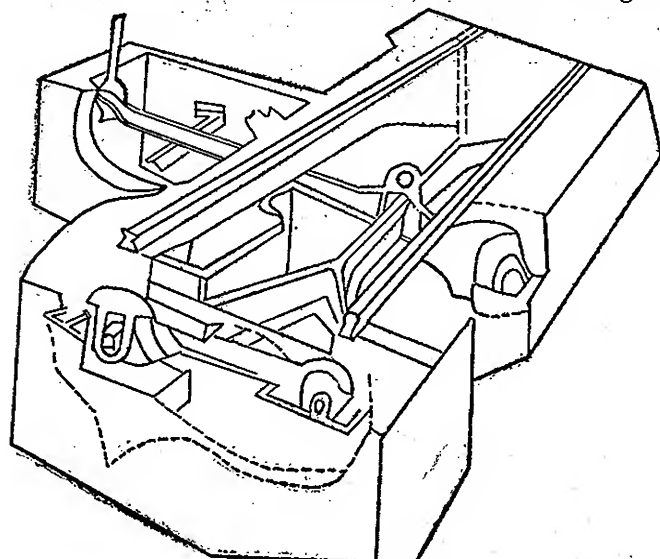


Fig. 28 — Weigh bridge

2. Capacities. — Weigh-bridges may be of the following capacities: 1 t, 2 t, 3 t, 5 t, 10 t, 15 t, 20 t, 25 t, 30 t, 40 t, 50 t, 60 t, 80 t, 100 t, 150 t, 200 t, 300 t, 400 t.

3. General Requirements. — (a) In addition to the general requirements specified in Part I of this schedule, weigh bridges shall comply with the requirements given below.

(b) Frame work. Where the weigh bridge is fitted with a frame work, it shall be built up of mild steel sections or cast iron or cast steel. It shall be of rigid structure, suitable strengthened so that it is capable of resisting excessive vibration and shall not throw the lever system out of alignment. Brackets shall be provided on the side and end frames to secure the frame work.

(c) Steel Yard. — (i) The steel yard of a weigh bridge shall not have any readily removable parts except the support for the proportional weights. There shall be one or more stops to prevent the sliding poise or poises from travelling behind the zero mark.

(ii) The minimum travel of the steel yard in weigh-bridges shall be 13 mm each way.

(iii) The top and bottom of the guide and/or steel yard shall be fitted with non-magnetic material.

(iv) When the steel yard is provided with notches, the latter shall be suitably protected.

(v) The value of the smallest division on the minor bar shall not exceed the greatest error allowed for that capacity (see table 31).

(d) Graduations. — The value of the smallest division on dials or minor steel yards, and wherever possible major steel yards or weighing instruments shall be 1 g, 2 g, 5 g or any multiple by 10 or a power of 10 (for instance, 100, 1000 etc.) of any of these weights.

(e) Platform. — (i) The platform shall be either chequered or plain, and shall be made of cast iron or steel plates. It shall be rigid and sufficiently strong to carry the maximum load. The foundation shall provide for a manhole to facilitate easy access to the pit.

(ii) If a movable hatch, barrow, frame or bucket is used with the ordinary platform, it shall form an essential part of the machine without which it is not possible to balance the machine. The movable hatch, barrow, frame or bucket shall be identified with the machine and when in position on the platform, it shall be as central as possible.

(f) Balancing Arrangement. — The balancing arrangement for daily wear and tear shall have a range not exceeding 0.5 per cent of the capacity of the machine and not less than 0.125 per cent of the capacity each way. The balance box containing the balancing ball shall be securely attached to the steel yard, preferably by passing a bolt through the casting to the steel yard. The balancing ball shall be actuated by a detachable key.

(g) In the case of weigh bridges provided with dials: (i) racks and pinions shall be of suitable hard-wearing material finished smooth;

(ii) the extremity of the pointer shall in no position, be at a greater distance than 5 mm from the graduated surface of the dial. Further, the extremity of the pointer shall be on the graduated portion of the dial, and it shall be so made as not to obscure the graduations or make them difficult to read;

(iii) The dial shall be graduated into equal parts and the minimum width between graduations shall be not less than 2 mm.

(h) For no-loose weight steel yard machines, the total capacity shall be that which is indicated on the steel yard.

4. Proportional weights. — (a) All loose proportional weights shall be identified with the machine by a number or any other suitable mark of identification which shall be indelible. They shall be marked with their equivalent weights as shown in Fig. 29.

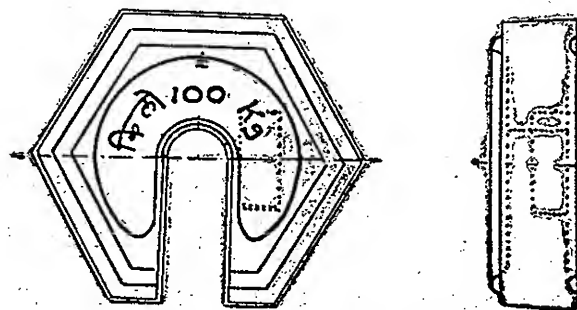


Fig. 29 — Proportional weight.

(b) Proportional weights shall be hexagonal in shape with a slot of suitable size to allow their being placed on the counter balance (see Fig. 29).

(c) The proportional weights shall be made of cast iron or brass.

(d) The proportional weights shall have one rectangular loading hole which shall be undercut or tapering outwards so as to hold lead securely for adjustment. The surface of the lead in the loading hole of a new proportional weight shall be at least 3 mm inside from the bottom surface of the weight.

(e) The smallest denomination of the proportional weight shall be equivalent to the weight represented by the maximum graduation on the minor bar.

(f) The denominations of the proportional weights shall be 1 kg., 2 kg., 5 kg. or a multiple or sub-multiple by 10 or a power of 10 (100, 1000 etc.) of any of these weights. Any number of proportional weights in any one of the aforesaid denominations may be included provided the total equivalent of all the proportional weights does not exceed the capacity of the weighing instrument.

Note:— While arriving at the capacity of the weigh-bridge, the maximum graduation shown on the steel yard in the case of «loose-weight» weigh bridges and on the minor bar in the case of «no-loose weight» type weigh-bridges shall not be taken into account.

(g) The total capacity of the machine shall include the capacity of graduated tare bar or bars wherever provided.

Note:— When tare bars are used and are not graduated except with a zero mark only, they shall not be taken into account when calculating the capacity of the machines. Ungraduated tare bars shall be marked with zero.

5. Tests and Test requirements:— (a) The steel yard of a weigh bridge shall remain horizontal at no-load.

(b) Weigh-bridges shall be tested to verify the accuracy of graduations or notches up to the total capacity.

(c) All loose proportional weights, where these are provided, shall be tested and then suitably sealed to prevent tempering.

(d) With one quarter of the maximum load (or as near thereto as practicable) placed in the middle or at any of the corners of the platform, the weigh-bridges shall indicate the same weight within half the limits of error prescribed in Table 31 in col. 3 for non-dial type machines and in col. 4 for dial type machines.

TABLE 30
Range of balancing arrangement

Capacity (1)	Range of balancing arrangement	
	Maximum 0.5 per cent of capacity each way (2)	Minimum 0.125 per cent of capacity each way (3)
t	Kg	Kg
1	5	1.20
2	10	2.50
3	15	3.75
5	25	6.2
10	50	12.5
15	75	19.0
20	100	25.0
25	125	31.0
30	150	35.5
40	200	50
50	250	62
60	300	75
80	400	100
100	500	125
150	750	188
200	1000	250
300	1500	375
400	2000	500

(e) Weighbridges with steel yard arrangement shall be tested for sensitiveness and error at full load or as near to it as practicable. The sensitiveness and permissible error shall not exceed the limits prescribed in Col. 2 and 3 respectively of Table 31.

(d) The machines shall be tested at loads corresponding to all major divisions or notches.

(ii) With the exception of sensitiveness test, the other test mentioned above shall be carried out in a similar manner on dial type machines also. These machines shall comply with the requirements prescribed in col. 4 of Table 31.

6. Identification of parts.— Detachable parts which may affect the accuracy of the weigh bridge shall be indelibly numbered or marked so as to facilitate identification.

7. Stamping.— (a) Dial machines shall be fitted with a soft metal plug for receiving the stamp of the verification authority and wherever practicable, this plug shall be passed through the dial and frame. The plug or stud fitted on the dial shall be so supported as to allow no risk of damage to the instrument.

(b) On weighbridges other than dial machines, a plug or stud shall be provided in a conspicuous position on the indicating lever or steel yard.

TABLE 31
Sensitiveness and errors for weighbridges

Capacity of machine t	Verification		Inspection	
	Greatest error allowed in excess or deficiency when fully loaded for		Greatest error allowed in excess or in deficiency when fully loaded for	
	Sensitiveness when fully loaded		Sensitiveness when fully loaded	
	Non-dial type Machines	Machines fitted with dials	Non-dial type Machines	Machines fitted with dials
kg	kg		kg	kg
1	1.1	1.2	3.3	2.4
2	1.2	1.4	3.6	2.8
3	1.3	1.6	3.9	3.2
5	1.5	2.0	4.3	4.0
10	2.0	3.0	6.0	6.0
15	2.5	4.0	7.5	8.0
20	3.0	5.0	9.0	10.0
25	3.5	6.0	10.5	12.0
30	4.0	7.0	12.0	14.0
40	5.0	7.0	15.0	14.0
50	5.2	7.8	15.6	15.6
60	5.5	8.5	16.5	17.0
80	6.0	10.0	18.0	20.0
100	6.5	11.5	19.5	23.0
150	7.8	15.2	23.4	30.4
200	9.6	19.0	27.0	38.0
300	15.0	30.0	45.0	60.0
400	20.0	40.0	60.0	80.0

PART VIII Crane weighing machines

1. Definition.— A «crane weighing machine» is a weighing instrument designed on lever or spring principle specially constructed for suspension from the hook of a crane and fitted with a hook for lifting the load.

Note:— A lever type machine with open steelyard is illustrated in Fig. 30; Fig. 31 illustrates a dial type machine.

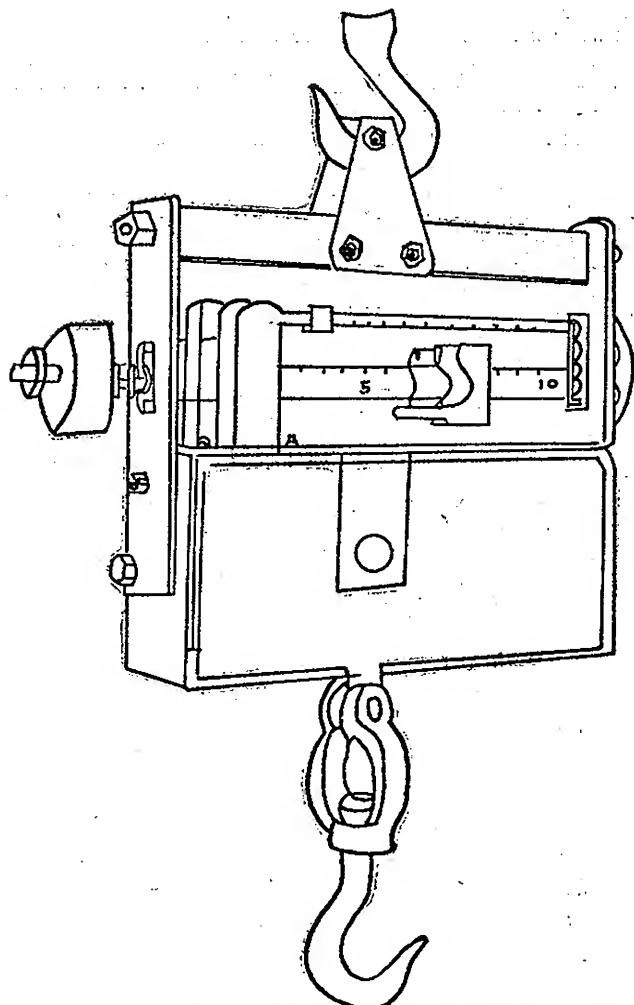


Fig. 30 — Crane weighing machine, steelyard type.

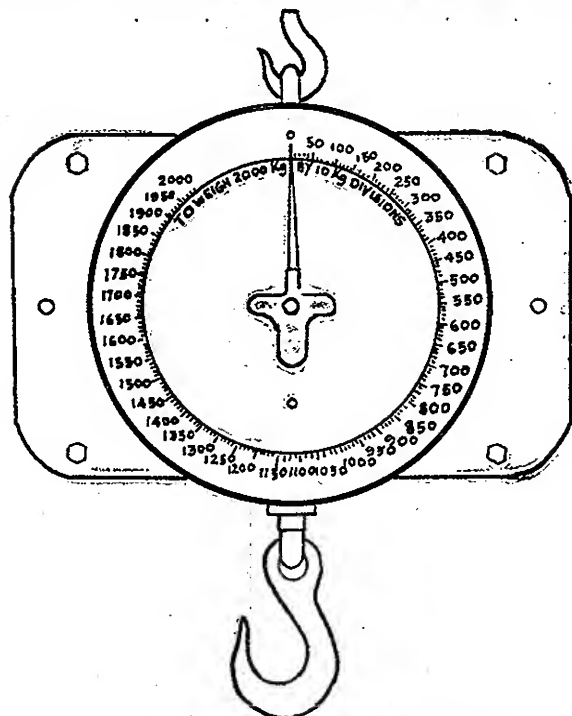


Fig. 31 — Crane weighing machine, Dial Type.

2. Capacities. — Crane weighing machines may be of the following capacities: 500 kg, 1 t, 2 t, 3 t, 5 t, 10 t, 15 t, 20 t, 30 t, 50 t, 100 t and 200 t.

3. General requirements. — (a) In addition to the general requirements in Part I of this Schedule, Crane weighing machines shall comply with the following requirements: —

(i) The machine shall be sufficiently strong to withstand wear and tear in the exacting conditions under which it works.

(ii) No crane weighing machine shall become a permanent link in the lifting gear.

(iii) All working parts in a crane weighing machine shall, as far as possible, be suitably protected from the dust and damp of the atmosphere. In a lever type machine, the steelyard shall be made of corrosion resistant steel to withstand atmospheric influence and shall be sufficiently rigid and accurate.

(iv) In dial type machines, the racks and pinions shall be of suitable hard wearing materials and finished smooth.

(v) The range of balancing or adjusting arrangement shall not exceed 2 per cent of the capacity of the machine (see Table 32).

(vi) In a steelyard type machine, there shall be free movement of the steelyard. In a dial type machine, the dial indicator shall work freely and return to its initial starting point after the load is removed.

(vii) In the case of a crane weighing machine provided with hooks, trays or slings, these shall form essential parts without which it is not possible to balance the machine. These shall be identified with the machine.

(viii) The value of the smallest graduation on dials or minor steelyards and, wherever possible, major steelyard shall be 1 g, 2 g, 5 g or any multiples of 10 or a power of 10 (for instance 100, 1000 etc.) of any of these weights.

(ix) The total capacity of the machines shall include the capacity of graduated tare bar or bars wherever provided.

Note:— When tare bars are used and are not graduated except with a zero mark only, they shall not be taken into account when calculating the capacity of the machines. Ungraduated tare bars shall be marked with zero.

4. Tests. — (a) Crane machines of the steelyard type shall be tested for sensitiveness and greatest error at full load and shall comply with the requirements specified in Table 33.

(b) Crane machines of the dial type shall be tested for greatest error at full load and shall comply with the requirements specified in Table 34.

(c) Spring type crane machines shall not be tested for sensitiveness.

(d) For spring type machines, the limits of greatest error shall be double of those prescribed for steelyard machines (see Table 33).

(e) Each numbered graduation shall be tested and the instrument shall be correct whether the test is carried out with increasing or decreasing loads.

(f) The intermediate graduations shall also be tested to see that they are correct and are at proper distance apart.

(g) No test for sensitiveness at a load lower than the full load shall be made.

5. Stamping. — Crane machine shall be fitted with an irremovable plug in a conspicuous part, either on the steelyard or on the dial, to receive the stamp of the verification authority.

TABLE 32

Range of balancing arrangement

Capacity	Range of Balancing arrangement
500 kg.	10 kg.
1 t.	20 kg.
2 t.	40 kg.
3 t.	60 kg.
5 t.	100 kg.
10 t.	200 kg.
15 t.	300 kg.
20 t.	400 kg.
30 t.	600 kg.
50 t.	1000 kg.
100 t.	2000 kg.
200 t.	4000 kg.

TABLE 33

Limits for sensitiveness and greatest error for crane weighing machines — Steelyard type

Capacity	Verification		Inspection	
	Sensitiveness when fully loaded	Greatest error allowed in excess or in deficiency when fully loaded	Sensitiveness when fully loaded	Greatest error allowed in excess or in deficiency when fully loaded
500 kg.	100 g.	200 g.	300 g.	400 g.
1 t.	1.1 kg.	1.2 kg.	3.3 kg.	2.4 kg.
2 t.	1.2 kg.	1.4 kg.	3.6 kg.	2.8 kg.
3 t.	1.3 kg.	1.6 kg.	3.9 kg.	3.2 kg.
5 t.	1.5 kg.	2.0 kg.	4.5 kg.	4.0 kg.
10 t.	2.0 kg.	3.0 kg.	6.0 kg.	6.0 kg.
15 t.	2.5 kg.	4.0 kg.	7.5 kg.	8.0 kg.
20 t.	3.0 kg.	5.0 kg.	9.0 kg.	10.0 kg.
30 t.	4.0 kg.	7.0 kg.	12.0 kg.	14.0 kg.
50 t.	5.2 kg.	7.8 kg.	15.6 kg.	15.6 kg.
100 t.	6.5 kg.	11.5 kg.	19.5 kg.	23.0 kg.
200 t.	9.0 kg.	19.0 kg.	27.0 kg.	38.0 kg.

TABLE 34

Limits for greatest error for crane weighing machine — dial type

Capacity	Minimum weight corresponding to interval between successive graduations	Greatest error allowed in excess or deficiency when fully loaded	
		Verification	Inspection
(1)	(2)	(3)	(4)
500 kg	5 kg	A weight corresponding to half the interval between successive graduations.	A weight corresponding to the interval between successive graduations.
1 t	5 kg		
2 t	5 kg		
3 t	10 kg		
5 t	15 kg		
10 t	50 kg		
15 t	50 kg		
20 t	100 kg		
30 t	100 kg		
50 t	250 kg		
100 t	500 kg		
200 t	500 kg		

PART 1X

Automatic weighing machines

1. Definition. — An automatic weighing machine may be defined as any weighing scale which has an integral mechanism for automatically admitting and discharging a load, and may be fitted with an apparatus for counting or otherwise recording the number of loads handled.

2. Capacities. — Automatic machines shall be of the capacities as agreed upon between the purchaser and the seller.

3. Design and construction. — (a) Automatic weighing machines and their integral parts shall be identified with the machines by an indelible number or other mark of identification.

(b) The adjusting mechanism shall be suitably secured or constructed so that it cannot be tampered with.

(c) The capacity of the automatic weighing machine shall be marked legibly on a conspicuous part of the machine.

4. Tests. — (a) Automatic machines shall be tested for errors according to the requirements specified in the Table 35.

(b) The accuracy of the output of the machine shall be verified by reweighing in another weighing instrument not less than 20 continuous loads, or where practicable, the machine may be tested directly by the application of standard weights.

(c) In testing totalling machines, not less than 50 loads shall be passed over the machine, namely, 10 minimum loads, 10 maximum loads and 30 loads of the mean between the minimum and the maximum.

5. Stamping. — Automatic machines shall be fitted with a plug on the beam, shank or dial of the machine to receive the Inspector's stamp.

TABLE 35

Permissible errors for automatic machines

Use	Capacity	Error (Verification or inspection)	The allowances in these cases are subject to the proviso that the error tolerated shall not exceed the weight represented by half a minimum division, marked on the dial or steelyard.
Weighing small loads of tea.	20 g and upwards	0.5 per cent of the load in excess only	
Weighing grain, etc.	5 kg and upwards	0.25 per cent of the load in excess or deficiency	
Weighing coal, etc.	50 kg and upwards	0.5 per cent of the load in excess or deficiency	
« Totalling » machines used for weighing coal etc.	500 kg and upwards.	0.5 per cent of the total load of 50 weighings, in excess or deficiency.	

PART X

Self-indicating and semi-self indicating counter type weighing machines

1. Definition. — (a) Self-indicating Machine—a machine which on the application of the load to be weighed, indicates the whole of the load automatically. A typical self-indicating machine is illustrated in Fig. 32.

(b) Semi-self-indicating Machine—a machine which, on the application of the load to be weighed, indicates automatically only a portion of the weight of the whole load leaving the remainder to be balanced by weights or sliding poises fitted to the tare or capacity bars or by any other suitable means. A typical semi-self-indicating machine is illustrated in Fig. 33.

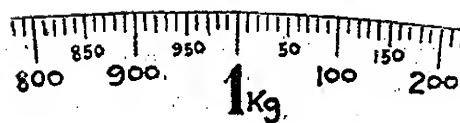
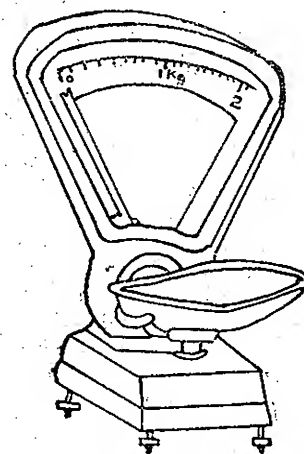


Fig. 32 — Self Indicating machine.

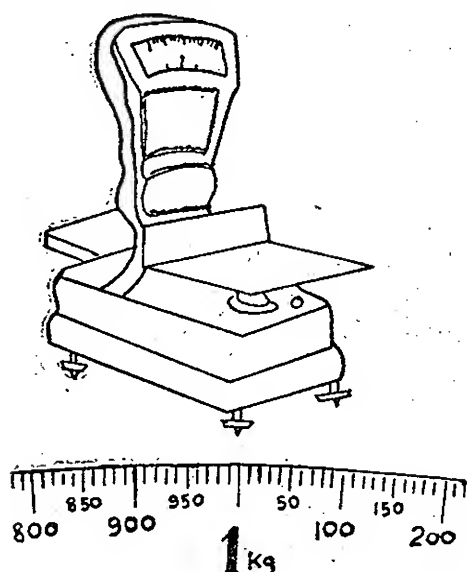


Fig. 33 — Semi-Self-Indicating machine.

2. Capacities. — The self-indicating or semi-self-indicating machines may be of the capacities shown in Table 36.

3. General Requirements. — (a) Self-indicating or semi-self-indicating machines are generally constructed by incorporating a beam or levers coupled to a pendulum or other type of resistance system, excluding springs, so as to produce an indicating arrangement for the machine. The arrangement of the lever system of machine shall be such that the horizontality of the goods and weight pan fittings throughout the movement of the beam is preserved. The machine shall be provided with dashpot or any other suitable arrangement so as to bring the pointer quickly to rest.

(b) The supports for the pans shall be of a suitable rigid structure. The pans shall be made of mild steel, stainless steel, brass or bronze, aluminium or its alloys, porcelain, enamel coated steel, glass or plastic material.

(c) The bearing surfaces, knife edges and points of contact of all stays, hooks and loops shall be of hard steel or agate. The knife edges and bearings shall be so fitted as to allow the beam to move freely and the knife edges shall rest on their bearings at practically their entire length. All levers and resistance mechanism shall be enclosed as far as possible.

(d) The machines shall have a balance box for minor adjustments. The balance box shall be permanently fixed, preferably beneath the weight pan, and shall be large enough to contain loose material to an amount upto one per cent of the capacity of the machine. No other adjusting contrivance shall be used. In case of self-indicating machines, the balance box shall be fixed below the goods pan.

(e) The chart of the machines shall graduated into equal parts and the width apart of the graduations shall be not less than 1.5 mm (unless magnification is provided on the chart) for a capacity of 10 kg and under, and not less than 2 mm for a capacity above 10 kg. The weights corresponding to one half the interval between consecutive graduation marks shall not exceed the greatest error allowed as shown in Table 36. The extremity of the pointer shall not exceed one mm in width and shall not be more than 3 mm away from the chart. The position of the index when there is no load shall be clearly indicated by zero mark.

(f) The value of the minor graduation on the chart shall correspond to one of the weights in the series, 1 g, 2 g, 5 g, or its decimal multiples of 10 or of powers of 10.

(g) The self-indicating and semi-self-indicating machines, excepting out-of-level-scales, shall be provided with leveling screws and a circular bubble.

(h) When tare bars are graduated, they shall only be permitted provided the chart capacity and the total capacity (chart plus tare bar) comply with capacities shown in Table 36.

Note: — When tare bars are used and are not graduated except with a zero mark, they shall not be taken into account when calculating the capacity of the machine. Ungraduated tare bars shall be marked with zero.

4. Tests. — (a) All self-indicating and semi-self-indicating machines shall be tested on a horizontal level plane.

(b) The machines shall be tested throughout the full range of their capacity by progressively increasing the load, the permissible error shall not exceed the limits specified in Table 36.

(c) When the pans are loaded to half the capacity there shall be no appreciable difference in the weight indicated on the dial when the load is moved within a distance from centre equal to one third from the greatest length of the pan.

(d) When the goods pan is in the form of a scoop, the machine shall be correct to the prescribed limits of error if half the full load is placed against the middle of the back of the scoop and the other half in any position on the scoop.

(e) Self-indicating and semi-self-indicating machines shall not be tested for sensitiveness.

5. Stamping. — Each machine shall be provided with a plug or stud of soft metal on a conspicuous part of the beam or body for receiving Inspector's stamp. Such a plug or stud shall be made irremovable by under cutting it or by some other suitable manner.

TABLE 36

Limits for greatest error for self-indicating and semi-self-indicating counter type weighing machine

Maximum value of the minor graduation	Greatest error allowed in excess or in deficiency when fully loaded	
	Verification	Inspection
(A) Self-indicating machines.		
100 kg	200 g	100 g
50 kg	100 g	50 g
30 kg	100 g	50 g
20 kg	100 g	50 g
10 kg	50 g	25 g
5 kg	20 g	10 g
3 kg	10 g	5 g
2 kg	10 g	5 g
1 kg	10 g	5 g
500 g	5 g	2.5 g
200 g	2 g	1.0 g
100 g	1 g	0.5 g
(B) Semi-self-indicating machines.		
100 kg	100 g	50 g
50 kg	40 g	20 g
30 kg	30 g	15 g
20 kg	20 g	10 g
10 kg	10 g	5 g
5 kg	10 g	5 g
3 kg	10 g	5 g
2 kg	10 g	5 g
1 kg	10 g	5 g
500 g	4 g	2 g
200 g	2 g	1 g
100 g	1 g	0.5 g

Note: — The maximum error shall not exceed the value of half the minor division indicated on the chart.

PART XI

Person weighing machines

1. Definition. — (a) — A 'person weighing machine' means an instrument with compound levers and with a platform to

receive the person to be weighed. The weight of the person is indicated with a steel yard or any other form of indicator or by a ticket printing device.

(b) Person weighing machines of steelyard, dial and ticket printing types are illustrated in Figs. 34 35 and 36 respectively. These drawings are illustrative only and do not specify any particular design.

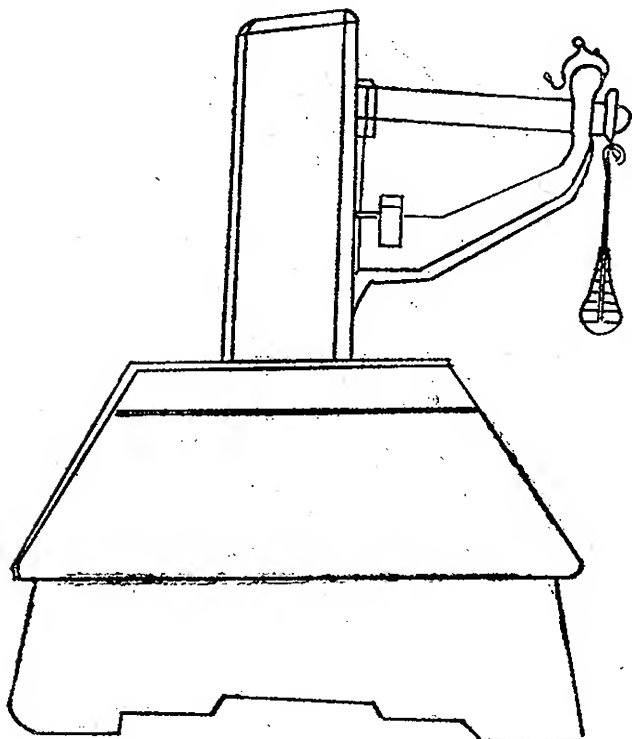


Fig. 34 — Person Weighing Machine, Steelyard Type.

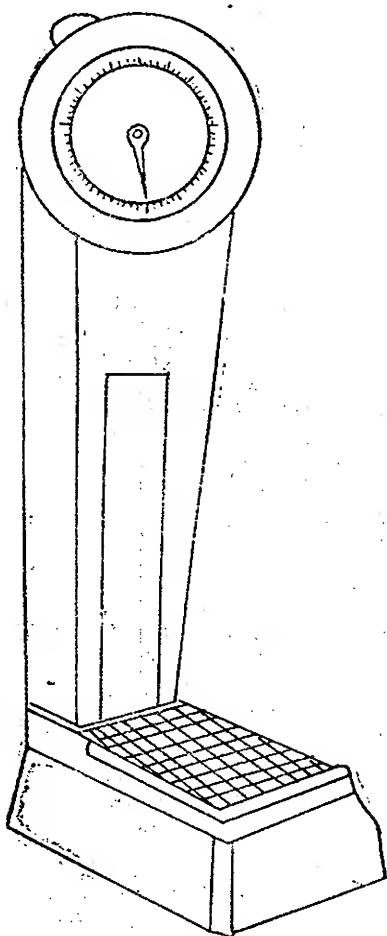


Fig. 35 — Person Weighing Machine, Dial Type

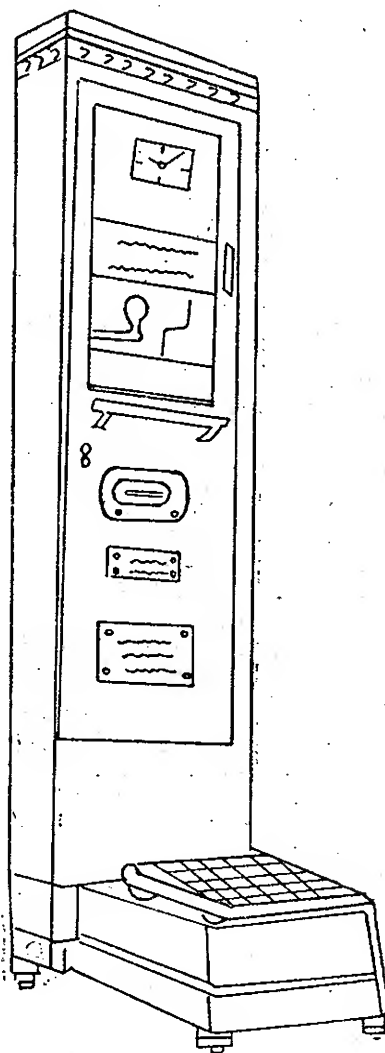


Fig. 36 — Person Weighing Machine Ticket Printing Type

2. Capacity. — The person weighing machine shall have a capacity not less than 120 kg.

3. General Requirements. — (a) Platform — The maximum size of the platform shall be 400 mm x 350 mm. The platform shall not extend beyond the frame on any side.

(b) Steelyard type machines. — (i) The steelyard shall not have any readily removable parts except the support for proportional weights. The maximum travel of a steelyard shall be 10 mm either way.

(ii) The top and bottom of the guide and/or steelyard shall be fitted with non-magnetic material, if these are made of ferrous material.

(iii) When the steelyard is provided with notches, the latter shall be suitably protected.

(iv) The value of the smallest division on the steelyard shall be graduated with 5 kg x 50 g divisions.

(v) Balancing Arrangement. — Where a balancing device is provided on the steelyard, the balance ball shall not be easily accessible. The balancing arrangement for daily wear and tear shall have a range not exceeding 0.5 per cent of the capacity of the machine and not less than 0.125 per cent of the capacity each way. The balancing device containing the balancing ball shall be securely attached to the steelyard. The balancing ball shall be actuated by knurled handed bolt passing through it.

(c) Dial type machines. — (i) Racks and pinions shall be of suitable hard wearing material and shall be finished smooth.

(ii) The extremity of the pointer shall in no position be at a greater distance from the graduated surface of the dial than 5 mm and shall be made to meet but not to obscure the graduations marks.

(iii) The dial shall be graduated into equal parts and the minimum width apart of the graduations shall not be less than 1.5 mm. The minimum graduation shall be 500 g.

(d) Ticket printing type machines.—Racks and pinions shall be of suitable hard wearing material and shall be finished smooth.

(ii) The weight shall be legibly indicated on the ticket.

4. Proportional weights.—(a) All loose proportional weights shall be identified with the machine by a number or any other suitable mark of identification which shall be indelible. They shall be marked with their equivalent weights in the following manner:

किलो 5 kg.

(b) Proportional weights shall be hexagonal in shape with a slot of suitable size to allow them being placed on the counter balance.

(c) The proportional weights shall be made of cast iron or brass.

(d) The proportional weights shall have one rectangular loading hole which shall be undercut or tapering outside so as to hold lead securely for adjustments. The undercut hole shall be of reasonable size so as to accommodate the lead required for adjustments. The surface of the lead in the loading hole shall not be less than 2 mm. inside from the bottom surface of the weight.

(e) The steelyard type person weighing machine shall be provided with suitable proportional weights. The denominations of proportional weights shall be 1 kg, 2 kg, 5 kg or a multiple or sub-multiple by 10 or a power of 10 (100, 1000 etc). The total value of the proportional weights shall not exceed the capacity of the machine. For the purpose of calculating total capacity the graduation on the steelyard shall not be taken into account.

5. Tests.—(a) The steelyard of the person weighing machine with steelyard arrangement shall remain horizontal at no load on the platform.

(b) With load weighing one quarter of the maximum capacity of the machine or as near thereto as is practicable, the weighing machine shall indicate the same weight within half the prescribed limits of error whether the load is placed in the centre or on any of the four corners of the platform.

(c) The machines shall be tested to verify the accuracy of graduations upto the total capacity.

(d) Person weighing machines with the steelyard arrangement shall be tested for error as well as for sensitiveness at full load. The permissible errors and sensitiveness are given in the table 37.

(e) Person weighing machines provided with dial type indicator or ticket printing device shall be tested for errors only. No sensitiveness test shall be taken on such machines. The permissible error at any load shall not exceed the limits prescribed in Table 37.

TABLE 37

Limits for greatest error for person weighing machines

Type of Machine	Sensitiveness when fully loaded	Greatest error allowed in excess or in deficiency when fully loaded	
		Verification	Inspection
1 Steel yard	25 g	50 g	100 g
2 Dial type	—	250 g	500 g
3 Ticket type	—	500 g	1 kg

PART XII

Baby weighing machines

1. Definition.—a) A baby weighing machine shall mean a weighing machine with a pan to receive the baby to be weighed. A typical baby weighing machine is illustrated in Fig. 37.

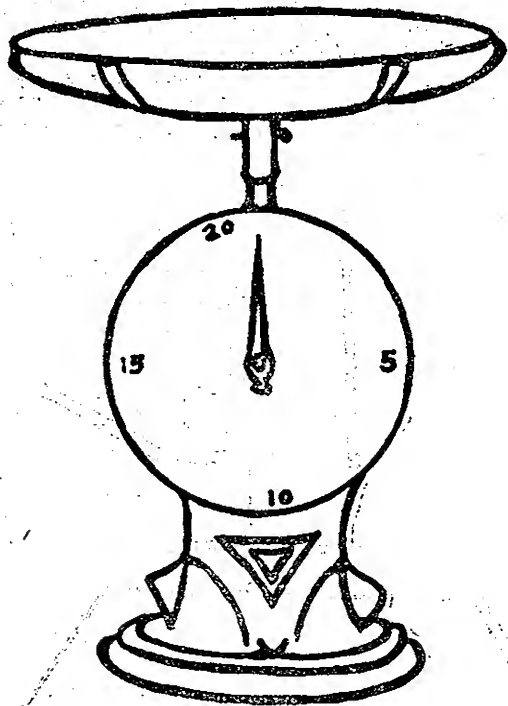


Fig. 37 Baby weighing machine

2. Capacity.—a) The machines shall have a maximum capacity of 10, 15 or 20 kg.

3. General requirements.—a) The pan for the baby shall be either an oval or a rectangular basin, or an open-ended trough of the following approximate dimensions:

	Minimum dimensions mm
Length	550
Width	300
Depth:	
Basin type	100
Trough type	125

b) The pan shall be smooth, non-porous; readily cleanable and of adequate strength and should preferably be made of a low heat-conducting material. Wicker-work shall not be used in the construction of the pan.

c) Counter type baby weighing machines shall be provided with hard rubber or fibre stops to prevent noise or 'jar' in the out-of-balance position.

d) All machines shall be so constructed as to enable a direct net weighing to be obtained.

e) Baby weighing machines of the spring-balance, self-indicating or semi-self-indicating types shall be fitted with efficient oscillation control devices.

f) In spring-balance, self-indicating or semi-self-indicating type of baby weighing machines, the dial shall be graduated into equal parts and the minimum distance between consecutive graduations shall be not less than 2 mm. Provision of a screw for adjustment of the pointer to correct zero error shall also be provided.

g) The extremity of the pointer shall not exceed 1.0 mm in width and shall be not more than 3.0 mm away from the graduations on the dial. The weight corresponding to the interval between consecutive graduation marks shall not exceed 50 g.

h) The base of the machine shall be wide and heavy to avoid tilting and the position of the index, when there is no load, shall be clearly indicated by a zero mark.

i) When the weighing machine is provided with an adjustable pointer, the range of adjustment shall not exceed one percent of the capacity of the machine.

4. Tests.—a) In spring-balance, self-indicating or semi-self-indicating type of machines, the permissible error shall not exceed the weight corresponding to half the interval between consecutive graduations.

b) When a load equal to half the capacity of the machine is placed at the farthest point from the centre of the pan

and the other half at any position, the machine shall be correct to the prescribed limit of error.

c) Each graduation of the machine shall be tested.

d) For counter type machines, the sensitivity and the greatest error shall be as under:

Capacity	Sensitiveness when fully loaded	Greatest error in excess or Deficiency when fully loaded	
		Verification	Inspection
kg	g	g	g
10	7.0	10.5	21
15	9.0	12.0	24
20	9.0	13.5	27

e) The machine shall be correct whether the test is made by progressively increasing or decreasing loads provided that in either case the machine is allowed to vibrate before the reading is taken.

f) The spring-balance type machine shall be loaded to its full capacity and the load maintained for a period of 24 hours after which it shall be removed. Four hours after removal of the load, the balance shall not show any permanent set. Further, when tested as stated in (4e), it shall record correct readings.

5. Sealing.—a) Each machine shall be provided with a plug or stud of soft metal on a conspicuous part of the beam or the body for receiving a seal. Such a plug or stud shall be made irremovable by undercutting it or by some other suitable method.

SCHEDULE VII

(See Rule 10)

Specifications for commercial measuring instruments

PART I

General

1. Definitions.—A 'measuring instrument' is a mechanism or machine designed to measure and/or deliver liquid products by volume.

The expression 'correct' means correct within the limits of errors prescribed in these Rules.

2. Classification.—Measuring instruments of the following categories are included in these specifications:

(a) Dispensing pumps.

(b) Meters used for the measurement of quantities of oil and/or liquids flowing through pipe lines or in package filling or deliveries to and from oil tanks, wagons, road vehicles, aviation refuellers etc.

(c) Volumetric container filling machines.

(d) Stroke measures commonly used in measuring out lubricating oils and other petroleum products.

(e) Length and time measuring instruments.

3. General Requirements.—(a) A measuring instrument shall be of such material, design and construction as to ensure, under normal working conditions, the following requirements:

i) Accuracy is maintained

ii) Operating parts continue functioning satisfactorily, and

iii) Adjustment remains reasonably permanent.

(b) A measuring instrument shall not be stamped unless it is complete with all parts and attachments concerned with the operation of measurement and delivery.

(c) Where an instrument has interchangeable or reversible parts their interchangeability or reversal shall not affect the accuracy of the instrument.

(d) All graduations indicating the quantities dispensed or delivered shall be legibly, clearly and indelibly marked.

(e) The graduated scale or indicating elements in a measuring instrument shall be so constructed as to show automatically its zero position and the amounts delivered up to the registering capacity of the instrument.

(f) Every measuring instrument of fixed type shall be so installed that the viewer can readily obtain a clear and unobstructed view of the indication of measurement and delivery.

(g) The design and construction of a measuring instrument shall be such as would prevent, as far as possible, tampering with the accuracy of the instrument either by inadvertent use or otherwise.

(h) Every volumetric container filling machine shall have the capacity of the container prominently and indelibly marked on it.

(i) The mechanism or devices attached thereto or used in connection therewith shall be so constructed, assembled or installed as to minimise the possibility of fraudulent practices.

(j) Every measuring instrument of a fixed type shall be so disposed that the purchaser has a clear and unobstructed view of the quantity indicated.

(k) No measuring instrument shall be so arranged as to deliver measured quantities at more than one outlet.

(l) Every graduated scale or other indicating device of the measuring instrument shall be in numerical sequence, reading in one direction only.

4. Marking.—(a) All commercial measuring instruments, such as dispensing pumps, meters, volumetric container filling machines shall be conspicuously, clearly and prominently marked with the registering capacity, name or registered trade-mark of the manufacturer and identification number.

(b) All commercial measuring instruments shall be provided with a plate revetted in a prominent position to receive the markings mentioned in 3(a) and the stamp of the inspecting authority.

5. Tests.—(a) All measuring instrument shall be tested under normal operating conditions.

(b) The measuring instrument shall not be stamped unless it is complete with all parts and attachments concerned with the operation of measurement and/or delivery.

(c) The measuring instrument shall be provided with one or more plugs and suitable means of sealing them to prevent tampering with stops or other adjustable parts affecting the quantity delivered. Seals shall be provided by the makers or users of the machines for Inspector's stamp.

(d) Measuring instruments which are not portable as well as portable measuring instruments of the types the Controller may specify in this behalf, shall be verified and stamped in situ in addition to any preliminary test in the manufacturers or dealers premises. Such a preliminary test shall be made at the request of the manufacturer or dealer.

6. Sealing.—(a) All measuring instruments shall be provided with one or more sealing arrangements for sealing by an inspecting authority to prevent tampering with stops or other adjustable parts affecting the quantity delivered.

PART II

Dispensing pumps

1. Definition.—(a) A 'dispensing pump' is a measuring instrument used in conjunction with a storage tank or tanks for affecting deliveries of liquid products by specified volumes.

(b) 'Wet-Hose' system. A type of device designed to be operated with the discharge hose full of liquid at all times. A wet hose, is the discharge hose in this type of device.

(c) 'Dry-Hose' system.—A type of device in which the discharge hose is completely drained following each delivery. A 'dry hose' is the discharge hose in this type of device.

2. Types.—Dispensing pumps shall be either of the meter type or container type.

3. General requirements.—(a) A dispensing pump shall essentially consist of—

(i) suitable casing or housing,

(ii) pumping unit,

(iii) metering unit or volumetric container,

(iv) register for quantities, and

(v) flexible hose with nozzle.

(b) Every dispensing pump shall be provided with an individual sales indicator, graduated to indicate all possible

deliveries. Any other counting or totalising device that may be provided, shall be so arranged as to avoid any possibility of confusion with the individual sales indicator.

(c) Every dispensing pump shall deliver correctly at reasonable uniform speed which shall be not less than 10 litres per minute.

4. Special requirements. — A dispensing pump of meter type shall be so constructed that, after a particular delivery cycle has been completed by movement of the starting lever to its shut-off position, an effective automatic interlock shall prevent a subsequent delivery being started until the indicating elements have been returned to their correct zero position.

(b) A dispensing pump container type shall be so constructed that the individual sales indicator shall register only when discharge from each container has commenced. A notice shall be prominently exhibited on the pump panel to indicate clearly and prominently the following:

'Please ensure before starting delivery'

- (i) Sales indicator is set at zero.
- (ii) Container is full.

(c) Dispensing pumps of container type shall be provided with observation windows or other means for showing clearly that the container or containers are properly charged and discharged.

(d) Dispensing pumps delivering liquid under pressure shall work on the 'wet-hose' system, fitted with a nozzle having combination-control valve and automatic pressure discharge valve which should operate under the pressure at which the pumps are designed to deliver.

(e) Dispensing pumps delivering liquid under gravity shall work on the 'dry hose' system. The 'dry hose' shall be of such length and stiffness as to facilitate complete and rapid drainage of the hose pipe and shall be provided with a nozzle without any valve.

(f) The length of the discharge hose on the dispensing pump shall not exceed 5 metres from the outside of the housing of the pump to the inlet end of the discharge nozzle.

(g) A dispensing pump of the meter type shall have an effective air eliminator unit situated after the pumping unit and immediately preceding the metering unit.

(h) A dispensing pump of the container type shall have a suitable air vent to preclude the possibilities of air-trap in the volumetric container.

5. Tests. — (a) All dispensing pumps shall be tested for accuracy of discharge as described hereunder:

(b) A dispensing pump shall be tested under practical working conditions with the liquid that the instrument is intended to deliver.

(c) All dispensing pumps shall be verified by check measures. The check measures may be of the denominations 1, 5, 10 and 20 litres.

(d) Every check measure shall be verified against the appropriate working standard measure at least once in every period of three months and duly sealed.

(e) Before commencing checking of dispensing pump, the pump shall be run for a few minutes to ensure that all the units are functioning smoothly and also the discharge hose has been wetted.

(f) A dispensing pump being tested for accuracy shall be tested for leakage by being first fully primed.

6. Procedure for testing. — The procedure for testing a dispensing pump shall be as follows: —

(a) The standard check measure shall first be filled to wet the entire inside surface. It shall then be emptied.

(b) The pointer (meter type) or reading (container type) of the recording mechanism shall then be set at zero.

(c) The pump shall be operated to dispense the liquid into the standard check measure until the pointer (meter type) is at zero position again or the reading (container type) records the capacity of the check measure.

(d) If the quantity of liquid delivered is in error beyond the permissible limits, the instrument shall be adjusted so that it delivers a quantity within permissible limits of error.

(e) Steps (b), (c) or (d) shall be repeated until the pump gives two consecutive deliveries within permissible limits of error.

(f) If the instrument has been found to give correct measure in the initial test itself, further test of accuracy shall be made and recorded.

7. Permissible error. — The permissible limits of error are specified below: —

Quantity	Verification (errors in excess)	Inspection	
		Error/Excess	Error/Deficiency
1	ml		ml
20	100	same as on verification	50
10	50		25
5	30		15
1	10		5

No error in deficiency shall be permitted during verification.

8. Sealing and stamping. — After adjustment for correct delivery lead-and-wire seals shall be applied in such manner that no further adjustment can be made, without mutilating the seal or seals. Plain wire shall not be used for lead-and-wire seal or seals. Inspector's stamp on the lead seal or seals shall be affixed by means of plier. Inspector's stamp shall also be marked on the name plate fixed on the dispensing pumps.

9. Name Plate. — A Name plate to be fixed on the petrol pump for identification shall be of the shape and design shown below: —

GOA, DAMAN AND DIU WEIGHTS & MEASURES
(enforcement) Act 1968

Name of the owner of the pump and pump No.

Capacity of	Petrol H. S. D.	D. Pump	Litres
* Year			
* Quarter			
* Emblem			

* Columns for Inspector's stamp.

10. Capacity. — The capacity of the dispensing pump of meter type shall be the maximum graduation on the dial or register.

The capacity of a dispensing pump of container type shall be the capacity of the container and, where there are more than one container, the aggregate capacity of the containers.

PART III

Volumetric container filling machines

1. Description. — (a) A volumetric container filling machine shall consist of a basin or basins, the capacity each of which shall depend on the capacity of the containers, which it is intended to fill. The operation shall consist of first filling the machine to the required level and then emptying out the contents into the container or containers.

(b) The machines shall have capacities of 1, 2, 5, 10, 15 and 20 litres.

2. General requirements. — (a) The design of the filling machine shall be such that the measured quantity shall be entirely drained out on opening of the delivery valve.

(b) The basin shall be provided with adequate sight glasses, observation windows, cut-off valve or other means indicating clearly that the basin or basins are properly charged.

(c) The basin shall be provided with a suitable device, such as a displacer, to enable adjustment of the capacity of the basin.

(d) Every flexible hose for discharging liquid from the basin together with the rigid delivery pipe which empties itself on discharge, shall be so arranged as to provide for ready and adequate drainage of the liquid.

(e) The filling machine shall be rigidly fitted on a stand.

(f) The walls of the basin shall be strong enough as not to cause any appreciable deflection due to the pressure of the liquid.

3. Tests. — (a) All volumetric container filling machines shall be tested for accuracy of discharge as follows:

(b) A volumetric container filling machine shall be tested under the actual working conditions with a suitable liquid preferably the one which the instrument is intended to deliver.

(c) Before checking a volumetric container filling machine, the inside of the basin or basins and the discharge hose and pipe shall be wetted by filling the machine and emptying.

(d) For testing volumetric container filling machines, a standard test measure shall be used.

(e) The procedure for testing the accuracy of volumetric container filling machines shall be as follows:

i) The Standard test measure shall first be filled to full capacity in order to wet all inside surfaces. It shall then be emptied and completely drained.

ii) The machine shall then again be filled to the full capacity.

iii) The contents of each container of the machine shall be measured with a standard test measure/measures and the quantity so measured will indicate that the capacity is:

- a) within the permissible error, or
- b) beyond the permissible error.

iv) If iii(b) be the case, the container shall be adjusted until the errors are brought within the permissible limits; and shall be repeated until the filling machines give two consecutive deliveries within the tolerance limits.

(f) Every container of the filling machine shall deliver correctly within the limits of tolerance specified in 3(g).

(g) The permissible errors shall not exceed the limits specified below:

Capacity	Maximum Permissible Error in Excess only
10 litres and above	0.1 per cent
Below 10 litres	0.2 per cent

4. Sealing. — (a) The volumetric container filling machines shall be provided by the manufacturer with a plug/plugs or stud/studs of soft metal to receive the stamp or seal of the verifying authority. Such plug/plugs or stud/studs shall be provided in a conspicuous part of the machine and shall be made in such a manner as to prevent its removal without obliterating the seal/seals.

PART IV

Taximeters

1. Terminology. — a) Taximeter — A device that computes and indicates the charges for the hire of a motor cab according to prescribed rates for distance and/or for time.

b) Face — That side of a taximeter on which fare is indicated.

c) Flag — A lever arm or any other device by which the operating condition of a taximeter is controlled.

d) Money Drop — An increment in the fare indication.

e) Initial Money Drop — The fare indication following the depression of the flag from FOR HIRE to the HIRED position.

f) Initial Distance or Initial Time Interval — The distance or the time interval corresponding to the initial money drop.

g) Basic Rates — The distance and waiting time rates for distances and time intervals other than those for the initial money drop.

h) Fare — That portion of the charge for the hire of a motor cab that is computed by a taximeter through the operation of the distance and time mechanism.

i) Extras — Charges to be paid by the hirer in addition to the fare for transportation of chargeable luggage.

j) Speed of Agreement of Basic Rates — The speed at which the basic distance and basic time rates correspond; that is, a meter operated at the speed of agreement for basic rates will show a money drop of distance travelled which is exactly the same as for time elapsed.

Example: —

Basic rate for time 10 paise per 5 minutes
Basic rate for distance 10 paise per $\frac{1}{2}$ km

Then basic rates agree when a distance of $\frac{1}{2}$ km is travelled in 5 minutes, that is, the speed of the vehicle is 4 km. per hour.

k) Effective Cab Wheel Circumference — The distance covered by the cab driven wheel with correctly inflated tyre in one complete revolution when a motor cab with a full complement of passengers is pushed forward in a straight line.

l) Pick-Up — Fare is calculated by the basic rate for time elapsed or alternatively by the basic rate for distance travelled according as the speed of the vehicle is below, or above the speed of agreement of basic rates. The arrangement of the transfer of calculation between the two basic rates is sometimes called the pick-up and sometimes the differential.

m) Bench Test — The test of a taximeter independent of the taxi cab.

i) Distance Test — The test to check the equivalent distance intervals, without effect of time, between money drops.

ii) Time Test — The test to check only the time intervals between money drops.

n) Road Test — The test over a measured course of a complete taximeter assembly when installed on the motor cab, the mechanism being actuated as a result of the motor cab travel.

o) Gear Box — An assembly of gears to permit adjustments for different tyre sizes, transmission, ratios and the like.

2. Constructional requirements. — a) The taximeter shall be so designed and constructed as to ensure reliability over a long period.

b) The taximeter shall be designed to register the fare to be charged for the distance travelled at a speed of or exceeding the speed of agreement of basic rates, and for the time elapsed when the cab is stationary or moving slower than the speed of agreement of basic rates.

c) When the fare is recorded by the distance mechanism, the first change in fare shall occur only when the prescribed distance has been travelled. After that, the indication shall change in steps proportional to the distance.

d) Mechanical — The mechanism for recording the time shall function, when required, as a clock. It shall be started by actuation of the flag. In the case of mechanical clock, it shall be capable of running 10 hours continuously.

e) Every meter shall be so constructed as to indicate in suitable windows upon the face the fare computed by time and/or by distance.

f) The meter shall be provided with an illuminated sign indicating when the cab is FOR HIRE. The lettering used in size, colour, and background shall be distinct by day or night at a distance of 25 m. If a plate is attached to the flag then its background colour shall be red.

g) The nature of information given in each window, namely, fare, position of flag, total and engaged distance, trips and (extra charges), shall be, if provided indicated by suitable wording immediately above or below the window. The words or signs denoting rupees and paise shall be placed immediately above, below or beside the appropriate disc or drum position. The face shall be provided with a suitable illuminating arrangement when the flag is in the HIRED or STOPPED position.

h) The letters and numerals indicating fare shall not be less than 10 mm in height and shall be so placed as to be easily read by the passenger. All other letters and numerals required to be shown on meters shall be of such size, form and colour as would render them clearly legible.

i) When the flag is moved from one position to the other, it shall give an audible warning.

3. Mechanism and operation. — a) The mechanism of meters shall be so designed that:

i) When the flag is upright, the words FOR HIRE shall be indicated in a window in the face. In this position the meter mechanism shall be arrested. No fare shall be visible to the intending hirer.

ii) When the flag is rotated forward to the HIRED position, the word HIRED shall replace FOR HIRE in

the window. In the HIRED position the clock mechanism shall be released and in action; the distance recording mechanism shall be released and available to record. Also the initial money drop shall be indicated in the fare window. As the cab is used, in due course further money drops will increase the fare shown.

iii) When the flag is rotated further from the FOR HIRE position to the STOPPED position, the word STOPPED shall replace HIRED in the window. The clock mechanism shall be arrested; the distance recording mechanism shall continue to be available to record. The fare, shall continue to be indicated in the fare window.

iv) The flag shall not move back from the HIRED position to FOR HIRE position unless it passes through the STOPPED position. It shall not go from the STOPPED position to HIRED position without making a positive stop at FOR HIRE position through a locking device to ensure that the mechanism is arrested.

v) The time and distance mechanisms shall not be engaged or disengaged except by the normal sequence of operation of the flag arm referred to in (i) to (iv) above.

vi) The fare and extra windows in the face shall be covered by a shutter at the FOR HIRE position. The removal and insertion of the shutter shall synchronize with the movement of the flag respectively from FOR HIRE to HIRED, and from STOPPED to FOR HIRE.

vii) The fare recorded by the meter for time and for distance travelled shall be according to the basic rates prescribed.

viii) The amount of fare shown in extra window, (if provided) shall be operated manually and shall advance by monetary units as prescribed.

4. Tests — a) Fare Indications — At all stages, the money drops on the dial shall make instant, accurate and complete change from one figure to the next. The error due to engaging and disengaging of the mechanism shall be within the tolerance limits specified in 5.

b) Flag — When the flag is unlocked from the FOR HIRE position, it should be checked that the last recorded fare has been cleared and the meter is properly re-set at the zero position. There shall be no possibility of the fare recording caught either partly cleared or on a rebound. It shall be checked that any reverse movement between the ratchet lock and the next does not make improper recording or any kind of injury possible. It should be properly seen that no possibility exists for tampering by improper use of the flag. From the moment the flag is put down the fare should be recorded and the figure expressing it shall appear on the face.

c) Distance Drive — There will always be a critical point in a fare recording mechanism when the next fare increment is almost due to be recorded. Should the journey end at the critical point, which is seldom possible, and inspect, such as slamming of the car door could cause the next increment to be recorded. A jerkey drive should be arranged in the test to check that no fault develops in the meter mechanism. Several tests shall be made to check that the possibility of a premature recording of an increment has been kept at a minimum.

d) Bench Test — The test shall be performed on taximeter fitted with an appropriate and reliable gear box.

i) Apparatus: a) Test bench — For testing taximeters, a device employing an electric motor to turn the taximeter spindle shall be used. This device shall also be capable of being rotated by hand. Brackets shall be provided for convenient mounting of the taximeters.

b) Counter — Counter shall be of such a design as to register one-tenth of a spindle revolution.

ii) Procedure — The test shall be carried out in two stages called «Short Haul» and «Long Haul».

a) Short haul test — With the flag in the STOPPED position the meter is driven for the equivalent of a distance of two or three kilometres. The number of input revolutions for each money drop are read from the counter and compared with the calculated number.

b) Long haul test — The flag shall be in the STOPPED position. The taximeter shall be operated continually for an interval corresponding to not less than 60 kilometres. Throughout the test, the taximeter shall be kept under observation so that any sticking of the money drop, any failure of the money drop to occur in the proper sequence, any incorrect alignment of figures or

any other abnormal condition may be discovered which would lead to rejection of the taximeter.

e) Time Test: i) Apparatus — This test requires that observations shall be made to the nearest second. A stop watch or a test type of interval timer, which may be started from and re-set to zero as desired, shall be used.

ii) Procedure — The time test consists of timing the intervals between money drops with the flag in the HIRED position and shall be conveniently divided into two tests, namely, individual interval test, and long interval test.

a) Individual interval test — The individual interval test shall be initiated by depressing the taximeter flag to the HIRED position and simultaneously starting the stop watch or timer. At the instant each money drop occurs, the elapsed time to the nearest second shall be recorded. The watch or timer shall not be stopped, but shall be allowed to continue running throughout the entire period of the time test. The test shall be continued for a minimum of one hour.

b) Long interval test — The taximeter shall not be cleared at the conclusion of the separate interval test, nor shall the stop watch or timer be stopped. Operation shall be continued for at least one hour or more, without intervening observations. When the test is to be concluded, the time at which money drop occurs shall be observed and recorded after which the taximeter shall be cleared.

5. Tolerances. — a) Bench Test — Tolerances for bench test shall be as follows:

a) On over-registration 1 percent
b) On under-registration 1 percent with an added tolerance of 30 m whenever the initial interval is included in the interval test.

b) Time test — Tolerances for time test shall be as follows:

a) On individual test:
Over-registration 5 percent
Under-registration 10 percent on initial interval,
5 percent on other intervals
b) Long interval test (excluding initial interval):
Over-registration Not permitted
Under-registration 3 percent

6. Sealing. — a) A taximeter head found correct on a bench test shall be sealed. When a complete installation on a motor cab is approved, each of the several connections from taximeter head to transmission (or wheel) shall be similarly sealed.

b) A plate of approved size and pattern shall be attached to the taximeter gear box or to the taximeter in such a manner that it cannot be removed without either removing the seals affixed by the testing authority or opening the taximeter or taximeter gear box. The plate shall show in raised or sunken words and figures:

i) the type of cab on which the taximeter is to be used, and
ii) the minimum effective circumference of the tyre on the wheels of the cab by which the taximeter can be driven and by which its action and accuracy may be tested.

7. Marking. — a) Taximeters shall be marked indelibly with the number of the instrument on the face plate and back plate.

b) All letters shall be in Roman script and the numerals shall be Indo-Arabic.

PART V

Autorickshaw meter

1. Terminology. — a) Autorickshaw Meter, Distance and Time Type — A device that computes and indicates the charges for the hire of an autorickshaw according to prescribed rates for distance and/or for time.

b) Face — That side of autorickshaw meter on which fare is indicated.

c) Flag — A lever arm or any other device by which the operating condition of the meter is controlled.

- d) Money Drop — An increment in the fare indication.
- e) Initial Money Drop — The fare indication following the depression of the flag from FOR HIRE to the HIRED position.
- f) Initial Distance or Initial Time Interval — The distance or the time interval corresponding to the initial money drop.
- g) Basic Rates — The distance and waiting time rates for distances and time intervals other than those for the initial money drop.
- h) Fare — That portion of the charge for the hire of autorickshaw meter that is computed by an autorickshaw meter through the operation of the distance and time mechanism.
- i) Speed of Agreement of Basic Rates — The speed at which the basic distance and basic time rates correspond, that is, a meter operated at the speed of agreement for basic rates will show a money drop of distance travelled which is exactly the same as for time elapsed.
- Example:
- | | |
|-------------------------|--------------------------------|
| Basic rate for time | 10 paise per 5 minutes |
| Basic rate for distance | 10 paise per $\frac{1}{4}$ km. |
- Then basic rates agree when a distance of $\frac{1}{4}$ km. is travelled in 5 minutes, that is, the speed of the vehicle is 4 km per hour.
- j) Effective Autorickshaw Wheel Circumference — The distance covered by the autorickshaw driven wheel with correctly inflated tyre in one complete revolution when an autorickshaw with a full complement of passengers is pushed forward in a straight line.
- k) Pick-Up — Fare is calculated by the basic rate for time elapsed or alternatively by the basic rate for distance travelled according as the speed of the vehicle is below, or above the speed of agreement of basic rates. The arrangement of the transfer of calculation between the two basic rates is sometimes called the pick-up and sometimes the differential.
- (l) Bench Test — The test of an autorickshaw meter independent of the autorickshaw.
- i) Distance Test — The test to check the equivalent distance intervals, without effect of time, between money drops.
- ii) Time Test — The test to check only the time intervals between money drops.
- (m) Road Test — The test over a measured course of a complete autorickshaw meter assembly when installed on the autorickshaw, the mechanism being actuated as a result of the autorickshaw travel.
- (n) Gear Box — An assembly of gears to permit adjustments for different tyre sizes, transmission ratios and the like.

2. Constructional requirements. — a) The autorickshaw meter shall be so designed and constructed as to ensure reliability over a long period.

b) The autorickshaw shall be designed to register the fare to be charged for the distance travelled at a speed of or exceeding the speed of agreement of basic rates, and for the time elapsed when the autorickshaw is stationary or moving slower than the speed of agreement of basic rates.

c) When the fare is recorded by the distance mechanism, the first change in fare shall occur only when the prescribed distance has been travelled. After that, the indication shall change in steps proportional to the distance.

d) Mechanical — The mechanism for recording the time shall function, when required, as a clock. It shall be started by actuation of the flag. In the case of mechanical clock, it shall be capable of running 6 hours continuously.

e) Every meter shall be so constructed as to indicate in suitable windows upon the face the fare computed by time and/or by distance.

f) The meter shall be provided with a sign indicating when the autorickshaw is FOR HIRE. The lettering used in size, colour, and background shall be distinct at a distance of 25 m. If a plate is attached to the flag then its background colour shall be red.

g) The nature of information given in each window, namely, fare and position of flag, shall be indicated by suitable wording immediately above or below the window. The words or signs denoting rupees and paise shall be placed immediately above, below, or beside the appropriate disc or drum position.

h) The letters and numerals indicating fare shall not be less than 10mm in height and shall be so placed as to be easily read by the passenger. All other letters and numerals required to be shown on metres shall be of such size, form and colour as would render them clearly legible.

3. Mechanism and operation. — (a) The mechanism of meters shall be so designed that:

i) When the flag is upright, the words FOR HIRE shall be indicated in a window in the face. In this position the meter mechanism shall be arrested. No fare shall be visible to the intending hirer.

ii) When the flag is rotated forward to the HIRED position, the word HIRED shall replace FOR HIRE in the window. In the HIRED position the clock mechanism shall be released and in action; the distance recording mechanism shall be released and available to record. Also the initial money drop shall be indicated in the fare window. As the autorickshaw is used, in due course further money drops will increase the fare shown.

iii) When the flag is rotated further from the FOR HIRE position to the STOPPED position, the word STOPPED shall replace HIRED in the window. The clock mechanism shall be arrested; The distance recording mechanism shall continue to be available to record. The fare shall continue to be indicated in the fare window.

iv) The flag shall not move back from the HIRED position to FOR HIRE position unless it passes through the STOPPED position. It shall not go from the STOPPED position to HIRED position without making a positive stop at FOR HIRE position through a locking device to ensure that the mechanism is arrested.

v) The time and distance mechanism shall not be engaged or disengaged except by the normal sequence of operation of the flag arm referred to in (i) to (iv) above.

vi) The fare window in the face shall be covered by a shutter at the FOR HIRE position. The removal and insertion of the shutter shall synchronize with the movement of the flag respectively from FOR HIRE to HIRED and from STOPPED to FOR HIRE.

vii) The fare recorded by the meter for time and for distance travelled shall be according to the basic rates prescribed.

4. Tests. — a) Fare indications — At all stages, the money drops on the dial shall make instant, accurate and complete change from one figure to the next. The error due to engaging and disengaging of the mechanism shall be within the tolerance limits specified in 5.

b) Flag. — When the flag is unlocked from the FOR HIRE position, it should be checked that the last recorded fare has been cleared and the meter is properly re-set at the zero position. There shall be no possibility of the fare recording caught either partly cleared or on a rebound. It shall be checked that any reverse movement between the ratchet lock and the next does not make improper recording or any kind of injury possible. It should be properly seen that no possibility exists for tampering by improper use of the flag. From the moment the flag is put down the fare should be recorded and the figures expressing it shall appear on the face.

c) Distance drive. — There will always be a critical point in a fare recording mechanism when the next fare increment is almost due to be recorded. Should the journey end at the critical point, which is seldom possible, an impact could cause the next increment to be recorded. A jerkey drive should be arranged in the test to check that no fault develops in the meter mechanism. Several tests shall be made to check that the possibility of a premature recording of an increment has been kept at a minimum.

d) Bench test. — The test shall be performed on autorickshaw meter fitted with an appropriate and reliable gear box.

i) Apparatus. — a) Test bench — For testing meters, a device employing an electric motor to turn the meter spindle shall be used. This device shall also be capable of being rotated by hand. Brackets shall be provided for convenient mounting of the meters.

b) Counter — Counter shall be of such a design as to register one-tenth of a spindle revolution.

ii) Procedure. — The test shall be carried out in two stages called 'Short Haul' and 'Long Haul'.

a) Short haul test. — With the flag in the STOPPED position the meter is driven for the equivalent of a dis-

tance of two or three kilometres. The number of input revolutions for each money drop are read from the counter and compared with the calculated number.

b) Long haul test.—The flag shall be in the STOPPED position. The meter shall be operated continually for an interval corresponding to not less than 60 kilometres. Throughout the test the metre shall be kept under observation so that any striking of the money drop, any failure of the money drop to occur in the proper sequence, any incorrect alignment of figures or any other abnormal condition may be discovered which would lead to rejection of the meter.

c) Time Test

i) Apparatus.—This test requires that observations shall be made to the nearest second. A stop watch or a desk type of interval timer, which may be started from and re-set to zero as desired, shall be used.

ii) Procedure.—The time test consists of timing the intervals between money drops with the flag in the HIRED position and shall be conveniently divided into two tests, namely, individual interval test, and long interval test.

a) Individual interval test.—The individual interval test shall be initiated by depressing the autorickshaw meter flag to the HIRED position and simultaneously starting the stop watch or timer. At the instant each money drop occurs, the elapsed time to the nearest second shall be recorded. The watch or timer shall not be stopped, but shall be allowed to continue running throughout the entire period of the time test. The test shall be continued for a minimum of one hour.

b) Long interval test.—The meter shall not be cleared at the conclusion of the separate interval test, nor shall the stop watch or timer be stopped. Operation shall be continued for at least one hour or more, without intervening observations. When the test is to be concluded, the time at which money drop occurs shall be observed and recorded after which the meter shall be cleared.

5. Tolerances.—a) Bench Test.—Tolerances for bench test shall be as follows:

a) On over-registration 1 percent

b) On under-registration 1 percent with an added tolerance of 30 m whenever the initial interval is included in the interval test.

b) Time Test.—Tolerances for time test shall be as follows:

a) On individual test:

Over-registration 5 percent

Under-registration 10 percent on initial interval, 5 percent on other intervals.

b) Long interval test (excluding initial interval):

Over-registration Not permitted

Under-registration 3 percent.

6. Sealing.—a) An autorickshaw meter head found correct on the bench test shall be sealed. When a complete installation on an autorickshaw is approved, each of the several connections from meter head to transmission (or wheel) shall be similarly sealed.

b) A plate of approved size and pattern shall be attached to the meter gear box or to the meter itself in such a manner that it cannot be removed without either removing the seals affixed by the testing authority or opening the gear box. The plate shall show in raised or sunken words and figures:

i) the type of autorickshaw on which the meter is to be used, and

ii) the minimum effective circumference of the tyre on the wheels of the autorickshaw by which the meter can be driven and by which its action and accuracy may be tested.

7. Marking.—a) Autorickshaw meters shall be marked indelibly with the number of the instrument on the face plate and back plate.

b) All letters shall be in Roman script and the numerals shall be Indo-Arabic.

PART VI

Autorickshaw meter distance type

1. Terminology.—a) Autorickshaw Meter, Distance Type.—A device that automatically calculates, at a predetermined rate and indicates the charges for hire of an autorickshaw by distance only. The face may also have a speedometer and distance indicator (odometer).

Note.—The mechanism to calculate fare by time is not provided in this type of autorickshaw meter.

b) Face.—That side of an autorickshaw meter on which fare is indicated.

c) Fare Neutralizer.—A device by which the fare indication is brought to zero.

d) Fare.—The charges for the hire of autorickshaw which are automatically calculated by the faremeter through the operation of the distance mechanism.

e) Effective Wheel Circumference.—The distance covered by the wheel, with correctly inflated tyre in one complete revolution when the vehicle with a full complement of passengers is pushed forward in a straight line.

f) Bench Test.—The test of an autorickshaw meter independent of the cab, to check the fare equivalent to the distance intervals.

2. Constructional Requirements.—a) The autorickshaw meter shall be a simple calculator indicating the fare for the distance travelled or speedometer cum fare meter combination with distance indicator (odometer).

b) The drive to the meter shall be from the front wheel or near axle, or gear box depending upon the arrangement provided by vehicle manufacturer. The instrument shall be calibrated to match the wheel ratio of the vehicle on which it is mounted. It shall carry two counters—one indicating the cumulative distance travelled and the other counter indicating the fare for the specific journey.

c) The meter shall be provided with a fare neutralizer. The rupee and paise wheel shall be distinguishable. The rupee wheel shall be in black with white digits and paise wheel shall be white with red digits.

d) The fare neutralizer shall be capable of moving only in one direction manually.

e) When the fare neutralizer is operated and the fare reading comes to zero, an audible click shall be given. Knocking, vibrations and wear and tear shall not affect the fare reading.

f) The meter or the autorickshaw shall be fitted with a suitable indicator to show whether the autorickshaw is occupied for hire.

3. Tests.—a) At all stages, instant, accurate and complete change from one figure to the next shall occur on the dial when the meter is operated. When the fare neutralizer is brought to the initial position, it should be checked that the last recorded fare has been cleared and the meter is properly re-set at zero position. There shall be no possibility of the fare recording being caught either partly cleared or on a rebound. It shall be checked that any reverse movement between the ratchet lock and the next does not make improper recording or any kind of injury possible. There shall be no possibility of tampering with the fare indication by improper use of the fare neutralizer.

b) Distance Drive.—There will always be a critical point in fare recording mechanism when the next fare increment is almost due to be recorded. Should the journey end at the critical point any impact could cause the next increment to be recorded. A jerky drive should be arranged in the test to check that no fault develops in meter mechanism. Several tests shall be made to check that this possibility has been kept at a minimum.

c) Bench Test.—The test shall employ a variable speed electric motor, a counter to note the revolution per minute and proper brackets for convenient mounting of the meters.

4. Tolerances.—a) Bench test:

i) On over-registration, one percent of fare recorded.

5. Sealing.—a) After complete installation, the meter shall be properly sealed by suitable tamper-proof method. The driving cable shall have provision for sealing at both the ends.

6. Marking.—a) Wheel ratio of the vehicle for which the meter is to be calibrated shall be indelibly marked at the back of the meter.

b) The number of the instrument shall also be marked.

c) All letters shall be in Roman script and the numerals shall be Indo-Arabic.

SCHEDULE VIII

(See Rule 12)

Abbreviations and denominations

1. Decimal Multiples and Sub Multiples.

Prefix	Value in terms of unit	Abbreviations
Kilo.	1000	k
Centi	0.01(10 ⁻²)	c
Milli	0.001 (10 ⁻³)	m
Micro	0.000,001 (10 ⁻⁶)	u

2. Weights.

Tonne	1000 kg	t
Quintal	100 kg	q
Kilogram	1 kg	kg
Gram	1 g	g
Milligram	1 mg	mg
Carat	200 mg	c

3. Capacity.

Kilo-litre	100 l	kl
Litre	1 l	l
Millilitre	1 ml	ml

4. Volume.

Cubic metre	m ³	m ³ or cum*
Cubic centimetre	cm ³	cm ³ or cucm*
Cubic millimetre	mm ³	mm ³ or cumm*

5. Length.

Kilometre	1000 m	km
Metre	1 m	m
Centimetre	1 cm	cm
Millimetre	1 mm	mm
Micron	1/1000 mm or 10 mm ⁻³	um

6. Area.

Square kilometre	1,000,000 m ²	km ² or sqkm*
Square metre	m ²	m ² or sqm*
Square centimetre	cm ²	cm ² or sqcm*
Square millimetre	mm ²	mm ² or sqmm*

*Both these abbreviations are current, but the first set should preferably be used.

Note.—No change shall be made in the abbreviations to indicate plurality.

SCHEDULE IX

(See Rule 12)

Certificate of verification

GOVERNMENT OF GOA, DAMAN AND DIU WEIGHTS AND MEASURES (ENFORCEMENT) ACT, 1968

Name of Inspector No. Date
Verification Certificate No. Headquarters.....
Camp Receipt No.

I hereby certify that I have this day verified and stamped/rejected the under mentioned weights, measures, etc. belonging to Trader no. under the above Act.

Quantity	Denomination	Capacity	Class Method Type	Verification Fee	Cartage conveyance & adjustment charges
	Weights				
	Measures				
	Weighing Instrument				
	Measuring Instrument				

Amount in words.

Total

Grand Total

Repaired by ...

Licence no. ...

Next verification due on ...

1. This certificate shall be exhibited in a conspicuous place where the apparatus is used.

2. Received the apparatus duly stamped/rejected.

Signature of the trader

Inspector of Weights and Measures.

SCHEDULE X

(See Rule 14)

Minimum permissible error in the net weight or measure of packed commodities

(1) Raw cotton packed in standard bales of 180 kg	Permissible error +5 kg
(2) Cotton Yarn	
Full bale of 200 kg	+10 kg
3/4 bale of 150 kg	+7.50 kg
1/2 bale of 100 kg	+5 kg
1/4 bale of 50 kg	+2.5 kg
(3) Cement	
cement at factory	+2%
in retail trade	+3%
(4) Tea.	
Retail packages of 500 g	+1% at the place of packing
250 g & 100 g	+1% at the place of packing
Chests packed at the places other than tea gardens	+1% at the place of packing

The net weights of packages or chests of tea shall be verified only at the place of packing.

(5) Jute cloth.	
Length of Jute cloth	+0.5%
(6) Paint.	Permissible error +1%
(7) Beer and Spirits filled in bottles	
Beer	(—)2.0%
Spirits	(—)2.0%, subject to a maximum of (—)7.5 ml.

The net measure of beer or spirits in bottles shall be verified only at the place where they are bottled.

(8) Biscuits.	
Net weight of package	Limit of permissible error

Below 500 g	+7%
500 g and above but below 1 kg	+6%
1 kg and above but below 2 kg	+5%
2 kg and above	+2.5%
(9) Piece Goods. An error not exceeding 7%	
(10) Foodgrains. Bags of 90 to 100 kg	+0.5% at the place of packing
(11) Sugar. White sugar packed in bags holding 1 quintal	+0.1%
(12) Infant food. Packages with net content between 1 kg and 2 kg	+3%
Packages between 500 g and 1000 g	+4%
Package upto 500 g	+5%
(13) Cotton cloth. Full bale of 1500 m	+100 m
3/4 bale of 1125 m	+ 75 m
1/2 bale of 750 m	+ 50 m
1/4 bale of 375 m	+ 25 m
(14) Milk. Bottle of capacity 500 ml	+10 ml
Bottle of capacity 250 ml	+ 8 ml
Bottle of capacity 200 ml	+ 8 ml

SCHEDULE XI

(See Rule 16)

PROCEDURE TO BE FOLLOWED FOR INSPECTION,
VERIFICATION AND STAMPING OF COMMERCIAL
WEIGHTS AND MEASURES AND WEIGHING AND
MEASURING INSTRUMENTS USED OR FOR USE IN
TRANSACTIONS

PART I

Weights and measures

1. WEIGHTS. — (a) All weights before stamping shall be verified for correctness against the corresponding test weights in the appropriate working standard balance subject to the permissible errors specified.

(b) Test weights shall be verified against the corresponding working standard weights in the appropriate working standard balance subject to the permissible errors specified to working standard weights.

(c) Weights shall be stamped on the lead in the loading hole at the bottom of the weight, provided that weights without an adjusting hole shall be stamped on the under surface.

(d) No weights used in gold and silver trade shall be stamped unless they are bullion weights.

(e) No weights used in pearl and precious stone trade shall be marked unless they are carat weights.

2. LIQUID MEASURES OF CAPACITY. — (a) Liquid capacity measures shall be tested by filling the working standard measure with water and emptying the contents of the Working standard into the measure under test.

(b) Such test measure of capacity shall be used to verify the liquid measure of corresponding capacity.

(c) In testing a glass measure, the capacity of which is not defined by the brim, the level of the water shall be taken at the bottom of the meniscus.

(d) Where the capacity is indicated by a line, the measure shall be tested to the bottom of the line.

3. MEASURES OF LENGTH. — (a) Every measure of length shall be verified by comparison with the Working standard.

(b) A link measure, or woven metallic or steel tape measure, shall be tested when subjected to a tension or pull as follows:

Link measure	8 kg
Woven Metallic Tape Measure	1 kg
Steel Tape Measure	2 kg for 1 m and 2 m 5 kg for 10 m, 15 m, 20 m, 30 m & 50 m.

(c) The measure under test shall be supported throughout its whole length on a plane and even base.

(d) Tape measures which are intended to be used in cases may be accepted for verification and stamping if submitted even without the case.

(e) All non-flexible measures of length shall be stamped on the rivets provided in the measure.

(f) In the case of tape measure, the stamps shall be placed on the metal strip attached to the beginning of the measure.

(g) In the case of link measures, the stamps shall be placed either on a metal label or disc permanently attached to the measure or on the brass handle.

4. VOLUME MEASURES. — (a) All measures of volume shall be examined with the object of discovering flaws or want of straightness and proper right angles at the corner.

(b) Every measure of volume shall be verified by comparing length of each side against the Working standard of length at or near the normal temperature.

(c) The limits of errors in the case of lengths of the sides of measures of volume shall be the same as prescribed for linear measures.

(d) All measures of volume shall be stamped near the top edge or brass plate securely fastened to them.

PART II

Weighing and measuring instruments

1. GENERAL. — Weighing and Measuring instruments shall be tested to conform to the specifications given in Schedule V and VI.

2. BEAM SCALES. — (a) On beam scales, the verification stamp shall be placed on the stud or plug on the beam, immediately under or over the central knife-edge.

(b) The Inspector may stamp the plug or stud in the same manner as he would stamp a weight.

3. COUNTER MACHINES, SPRING BALANCES, STEEL-YARDS AND AUTOMATIC MACHINES. — The verification stamp shall be placed upon the plug or stud provided in the instrument for that purpose.

4. PLATFORM MACHINES AND WEIGHBRIDGES. — (a) Weighbridges, platform machines and such other weighing instruments as the Controller may specify in this behalf, shall be verified and stamped in situ in addition to any preliminary test in the manufacturer's or dealers premises. Such a preliminary test shall be made at the request of the manufacturer or dealer.

(b) The verification stamp shall be placed upon the plug or stud provided for the purpose in the machine.

5. CRANE MACHINES. — (a) Hydraulic Machine in which it is necessary in order to get a correct weight indication, to twist the load hook, shall not be stamped unless a prominent notice to this effect is permanently affixed to the machine.

(b) The verification stamp shall be placed upon the plug or stud provided for the purpose in the machine.

PART III

Calibration of vehicle tanks for petroleum products and other liquids

1. DEFINITIONS. — (a) Vehicle Tank. — An assembly used for the delivery of liquids comprising a tank which may or may not be sub-divided into compartments, mounted upon a vehicle together with its necessary piping, valves, metres etc.

- (b) **Compartment.** — The entire tank, when this is not sub-divided, otherwise, anyone of these sub-divisions of a tank designed to hold liquids.
- (c) **Calibration.** — Verification and stamping of the capacity of the vehicle tank.
- (d) **Dip-stick.** — A square or rectangular metal bar of brass or any other suitable hard material used to determine the depth of liquid in the tank.
- (e) **Ullage stick.** — A T-shaped metal bar of brass or other suitable material used to determine the depth of the level of the liquid from the top of the dip pipe.
- (f) **Ullage indicator.** — A device bolted to the inside of a manhole neck, ring with the indicator set to any desired level to which liquid in the tank is required to be filled.

2. **TESTING MEDIUM.** — (a) **Compartment testing.** — Water or other appropriate liquid shall be used as a testing medium in determining the capacity of a vehicle tank compartment.

(b) **Meter testing.** — A Vehicle tank meter shall be tested with a liquid of the same character or of approximately the same viscosity as the liquid to be commercially measured through the meter.

3. **EQUIPMENT AND TOOLS.** — The following equipment and tools are required for calibration of vehicle tank —

- (a) **Proving measures.** When available, shall be checked for accuracy against an appropriate Working standard measure.
- (b) **Calibrated bulk meter.** — An accurate meter fitted with pre-set valve, air eliminator and strainer, which has been checked for accuracy against an appropriate Working Standard Measure.
- (c) A set of standard commercial measures.
- (d) Other equipment and tools viz., hose pipes, scribe, punchtry square, tyre pressure guage, hammer etc.

4. **CALIBRATION PROCEDURE.** — (a) Vehicle tanks used as measures shall be calibrated as capacity measures. In the case of meter equipped tanks, the meter shall be treated as a separate measuring instrument for purpose of calibration.

(b) The compartment capacity or capacities shall be taken as including the capacities of the delivery lines leading from the emergency, safety or master valve to the outlet valve (discharge valve) provided that in the case of vehicle compartments terminating in a single delivery pipe line fitted with an outlet valve the compartment capacity or capacities shall be taken as excluding the capacity of the delivery pipe line. A notice shall be prominently exhibited on the vehicle tank clearly and indelibly, the following:

Marked capacity includes capacity of delivery line.

Or

Marked capacity excludes capacity of delivery line as the case may be. The safety or master valve shall be positioned at the lowest point of outlet from the compartment.

(c) The proving measure or bulk meter should be mounted on an overhead gantry or a separate framework in a convenient position above a firm and level platform, preferably of concrete on which the vehicle stands during calibrations.

(d) The vehicle shall be placed in a level position before commencing calibration as the accuracy of calibration depends on the level of the tank; the sequence in which compartments are calibrated should be such as to minimise unequal spring deflection on the axles of the vehicle.

(e) The front and rear tyres of the vehicle should be at the correct pressures. The tyres should be inspected for wear which should be reasonably even and there should not be excessive difference in wear in the tread between the front set of tyres and the rear set at the time of calibration.

(f) The interior of the compartment should be inspected and cleaned where necessary.

(g) Before starting calibration, the pipelines, outlet valves and other connections shall be tested against leakage by partially filling and draining each compartment in turn through the outlet valve. During the process sufficient quantity of the testing medium should be introduced inside the compartment to wet the internal surface of the tank and pipelines.

(h) After taking the precautions mentioned above, the compartment to be calibrated shall be filled with appropriate

proving measures or bulk meters to the marked capacity of the compartment with the delivery lines leading to the outlet valve full or empty as provided in (b) above. The dip/ullage mark shall be taken carefully and the line shall be cut on the dip/ullage stick at right angles to the axis with the help of try-square and scriber. If an ullage indicator is used, it shall be correctly set and sealed.

(i) A mark should also be made on the dip stick to indicate the 'proof line' which is the level of the top surface of the dip pipe. In the case of ullage stick, the distance from the ullage point to the T-joint should be marked on the stick.

(j) Each compartment should be left full before proceeding to the next in sequence.

5. **PERMISSIBLE ERROR.** — (a) Proving measures shall have the following capacities and shall be adjusted within the following permissible errors.

Capacity	Permissible error
1	ml
50	50
100	100
200	200
500	500
1000	1000
1500	1500
2000	2000
5000	5000

(b) The maximum error for vehicle tank compartments shall be 0.05 percent in excess of the marked capacity of the compartments.

6. **MARKING.** — (a) The vehicle shall have a brass plate revetted in a prominent position on it to receive the Inspector's stamp. The brass plate shall bear the following particulars: title of weights and Measures Act, name of owner of vehicle, vehicle registration number, and the serial number and capacity of each compartment. Space should be provided on the plate for the Inspector's stamp. A simple design for a plate is given below:

THE GOA, DAMAN AND DIU WEIGHTS AND MEASURES
(ENFORCEMENT) ACT, 1968

Name of the Company
Vehicle Tank No.

Compartment No.	Compartment Capacity l.	Year	(Inspector's stamp)	
			Quarter	Emblem

(b) The capacity of the compartment shall be indelibly marked on the manhole cover of the compartment and also painted on each side of the compartment so that it is clearly visible. If there are more than one compartment, then each compartment shall have its capacity marked separately as above and the compartments numbered serially. The number of the compartment shall be also marked on the discharge valve pertaining to the compartment.

(c) The vehicle registration number as well as the capacity of the compartment shall be indelibly marked on the dip/ullage stick at the top end. If there is more than one compartment, the different faces of one dip stick may be used for markings and each face shall bear the vehicle number, the serial number of the compartment, the proof and dip lines of that compartment and the capacity of the compartment.

SCHEDULE XII

(See Rule 19, 21)

Fees payable for verification and stamping of weights, measures and weighing and measuring instruments

1. Weights

a) Bullion Weights

Denomination	Fee per piece Rs.
20 kg	3.00
10 kg	3.00
5 kg	2.00
2 kg	2.00
1 kg	2.00
500 g	0.75
200 g	0.75
100 g	0.75
50 g	0.75
20 g	0.75
10 g	0.75
5 g	0.75
2 g	0.75
1 g	0.75
500 mg	0.50
200 mg	0.50
100 mg	0.50
50 mg	0.50
20 mg	0.50
10 mg	0.50
5 mg	0.50
2 mg	0.50
1 mg	0.50

b) Brass Weights (other than Bullion)

Denomination	Fee per piece Rs.
1 kg	2.00
500 g	0.50
200 g	0.50
100 g	0.50
50 g	0.25
20 g	0.25
10 g	0.25
5 g	0.25
2 g	0.25
1 g	0.25

c) Sheet Metal Weights (other than Bullion)

Denomination	Fee per piece Rs.
500 mg	0.25
200 mg	0.25
100 mg	0.25
50 mg	0.25
20 mg	0.25
10 mg	0.25
5 mg	0.25
2 mg	0.25
1 mg	0.25

d) Iron and Steel Weights

Denomination	Fee per piece Rs.
50 kg	1.00
20 kg	1.00
10 kg	1.00
5 kg	1.00
2 kg	0.75
1 kg	0.75
500 g	0.25
200 g	0.25
100 g	0.25
50 g	0.25

e) Carat Weights

Denomination	Fee per piece Rs.
500 c	1.00
200 c	1.00
100 c	1.00
50 c	1.00
20 c	1.00
10 c	1.00
5 c	1.00
2 c	0.50
1 c	0.50
50/100 c	0.50
20/100 c	0.50
10/100 c	0.50
5/100 c	0.50
2/100 c	0.50
1/100 c	0.50
0.5/100 c	0.50

2. Capacity Measures (including) Vehicle Tanks, Dispensing Measures and Peg Measures

Capacity	Fee per piece
50 litres and above	Rs. 5.00 for the first 100 litre or part thereof plus Rs. 2.00 for every additional 100 litres or part thereof subject to a maximum of Rs. 500.00.

Denomination	Fee per piece Rs.
20 l	2.00
10 l	2.00
5 l	1.00
2 l	1.00
1 l	1.00
500 ml	0.50
200 ml	0.50
100 ml	0.50
50 ml	0.50
20 ml	0.50
10 ml	0.50
5 ml	0.50
2 ml	0.50
1 ml	0.50
18.5 l	2.00
60 ml	0.50
30 ml	0.50

3. Length Measures

a) Non-flexible Type

Denomination	Fee per piece Rs.
2.00 m	1.00
1.00 m (ordinary)	1.00
0.50 m (ordinary)	1.00
1.00 m (Graduated at every cm)	2.00
0.50 m (Graduated at every cm)	2.00

b) Woven Metallic Tapes

Denomination	Fee per piece Rs.
50 m	3.00
30 m	3.00
20 m	2.00
15 m	2.00
10 m	2.00
5 m	1.00
2 m	1.00

c) *Steel Tapes*

Denomination	Fee per piece Rs.
50 m	5.00
30 m	5.00
20 m	3.00
15 m	3.00
10 m	2.00
2 m	1.00
1 m	1.00

d) *Folding Scales*

Denomination	Fee per piece Rs.
1 m	1.00
0.5 m	0.50

e) *Surveying Chains*

Denomination	Fee per piece Rs.
30 m	3.00
20 m	2.00

4. *Weighing Instruments (other than Beam Scales of classes C & D, Automatic Weighing Machines and Totalising Machines)*

Denomination	Fee per instrument Rs.
400 t	250.00
300 t	200.00
200 t	150.00
150 t	120.00
100 t	100.00
80 t	90.00
60 t	80.00
50 t	70.00
40 t	70.00
30 t	70.00
25 t	50.00
20 t	50.00
15 t	50.00
10 t	40.00
5 t	40.00
3 t	25.00
2 t	25.00
1500 kg	15.00
1000 kg	15.00
500 kg	15.00
300 kg	15.00
250 kg	15.00
200 kg	10.00
150 kg	10.00
100 kg	10.00
100 kg and person weighing machines	10.00
50 kg	7.50
30 kg	7.50
20 kg	5.00
15 kg	5.00
10 kg	3.00
5 kg	3.00
3 kg	3.00
2 kg	3.00
1 kg	3.00
500 g and below	2.00

5. *Beam Scales (Classes C & D)*

Denomination	Fee per instrument Rs.
1000 kg	15.00
500 kg	10.00
300 kg	10.00
200 kg	5.00
100 kg	5.00
50 kg	3.00
20 kg	3.00
10 kg	3.00
5 kg	2.00
2 kg	2.00
1 kg	2.00
500 g and below	1.00

6. *Automatic Weighing Machines*

Denomination	Fee per instrument Rs.
Exceeding 10 t	100.00
Not exceeding 10 t but exceeding 1 t	75.00
Not exceeding 1 t but exceeding 50 kg	50.00
Not exceeding 50 kg but exceeding 10 kg	30.00
Not exceeding 10 kg	20.00

7. *Totalising Machines*

Each Machine	150.00
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8. *Volume Measuring Instruments*a) *Dispensing Pumps*

Each pump	50.00
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b) *Other Instruments*

Denomination	Fee per instrument
Exceeding 100 litres	Rs. 50.00 for the first 100 litres plus Rs. 40.00 for each additional 100 litres or part thereof subject to a maximum of Rs. 500.00.
Not exceeding 100 l but exceeding 50 l	Rs. 40.00
Not exceeding 50 l but exceeding 20 l	Rs. 25.00
Not exceeding 20 l	Rs. 20.00

9. *Linear Measuring Instruments*a) *Taximeters and Autorickshawmeters*

	Rs.
Each taximeter or autorickshawmeter	5.00

b) *Other Instruments*

Denomination	Fee per instrument
Exceeding 100 m	Rs. 10.00 for the first 1000 m plus Rs. 2.00 or every additional 100 m or part thereof subject to a maximum of Rs. 50.00.
Not exceeding 1000 m but exceeding 500 m	Rs. 10.00
Not exceeding 500 m but exceeding 100 m	Rs. 5.00
Not exceeding 100 m	Rs. 3.00

SCHEDULE XIII

(See Rule 23)

Procedure for seizure, detention and disposal

1. (a) Any weight or measure or weighing or measuring instruments, which is to be the subject of proceedings in a Court, shall be seized on issue of receipt to the concerned party to that effect.

(b) A Panchanama shall be drawn in any one of the following forms in such language as may be specified by the Controller in consultation with the State Government.

GOVERNMENT OF GOA, DAMAN AND DIU
WEIGHTS AND MEASURES (ENFORCEMENT) ACT 1968

PANCHANAMA

Place

Date ...

We the undersigned Panchas were this day called by Shri ...
Inspector of Weights and Measures ... City/District to the ...

of Shri ... Trader, situated at ... at about ... a.m./p.m. to witness the fact that Shri/Shrimati ... who is/are, owner/manager/servants of the shop refused permission to the said Inspector to inspect the Weights/Measures, etc., in his possession or control for trade or obstructed the entry of the said Inspector into the above trading premises by (give the manner of obstruction) ... or obstructed or hindered the said Inspector in the performance of his duties by (give the manner of obstruction or hindrance) ...

The Panchanama was read over and explained to us and it is a correct account of what we saw: —

1) ...

2) ...

(Signature of Panchas)

Name of Panchas and Address	Occupation	Caste	Age
-----------------------------	------------	-------	-----

Panchanama began at ... Before me.
finished at ...
Inspector,
Weights and Measures.
... City/District.

GOVERNMENT OF GOA, DAMAN AND DIU
WEIGHTS AND MEASURES (ENFORCEMENT) ACT 1968

PANCHANAMA

Place ...

Date ...

We, the undersigned Panchas, were this day called by Shri ..., Sr. Inspector/Jr. Inspector of Weights & Measures ... City/District, to the ... of Shri ... at about ... A. M./P. M. to witness the act of seizing certain Weights/Measures/Measuring Instruments from

In our presence the said Sr. Inspector/Jr. Inspector seized and took the custody of the articles mentioned in the following inventory which we testify to be true. The said articles were found in the possession of ... and/or we saw that they were being actually used by ... in transaction for trade or commerce.

No.	Denomination or capacity	Particulars and description of articles seized and detained	Grounds for seizure
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The Panchanama and the list of the articles mentioned in the above inventory were read over and explained to us and it is a correct account of what we saw.

1) ...

2) ...

(Signature of Panchas)

Name of Panchas and Address	Occupation	Caste	Age
-----------------------------	------------	-------	-----

Panchanama began at ... before me ...
finished at ...

Inspector of Wets. & Mes.
... City/District

SCHEDULE XIV

(See Rule 28)

Licensing forms

FORM "A"

OFFICE OF THE CONTROLLER OF WEIGHTS AND MEASURES, PANAJI

Licence to manufacture/repair weights, measures, weighing instruments or measuring instruments under the Goa, Daman and Diu Weights & Measures (Enforcement) Act, 1968.

Licence No. ...

Year ...

(1) The Controller of Weights and Measures, Goa, Daman and Diu Panaji hereby grants to ...

(Name and address of the party or parties)

a licence to manufacture/repair the following: —

- 1 ... (Include details of the types of weights, measures, weighing instruments or measuring instruments that are licensed to be manufactured/repared by the party).
- 2 ...
- 3 ...
- 4 ...
- 5 ...
- 6 ...

(2) The licence is valid for the party named above in respect of his workshop located at ...

(3) This licence is valid from ... to ...

(4) The manufacturer/repairer shall comply with the conditions noted below. If he fails to comply with any one of these, his licence is liable to be cancelled.

(5) The trade mark/monogram being used by the manufacturer is as under: —

(6) (For repairer only) The party is licenced to repair weights, measures, weighing and measuring instruments in the areas mentioned below:

Date ...

Place ...

(Seal)

Controller of Weights and Measures.
Goa, Daman and Diu.

Note: In the case of a firm, its name with the name of all its members should be given in paragraph (1)

Conditions of licence

The person in whose favour this licence is issued shall —

1 (a) comply with all the relevant provisions of the Act and Rules for the time being in force;

(b) not encourage or countenance any infringement of the provisions of the Act, or the Rules for the time being in force and shall report without delay to the Inspector any infringement that may come to his notice;

(c) exhibit this licence in a conspicuous part of the premises to which it relates;

(d) comply with any general or special directions that may be given by the Controller of Weights & Measures, Panaji; and

(e) surrender the licence if and when required to do so by the Controller, or any other officer employed under the Act.

2. Every condition prescribed after the issue of the licence shall, if notified in the official gazette, be binding on the person/persons to whom the licence has been granted.

FORM "B"

OFFICE OF THE CONTROLLER OF WEIGHTS
AND MEASURES, PANAJI

Licence to deal in weights, measures weighing instruments or measuring instruments under the Goa, Daman and Diu Weights & Measures (Enforcement) Act, 1968.

Licence No.... Year...

(1) The Controller of Weights and Measures Goa, Daman and Diu Panaji, hereby grants to... (Name and address of the party or parties).

...
...
...

a licence to deal in the following:

- 1... (Indicate details of the types of weights, measures, weighing or measuring instruments that are licenced to be dealt with by the party).
2...
3...
4...
5...
6...

(2) The licence is valid for the party named above in respect of premises located at ...

...

(3) This licence is valid from ... to ...

(4) The dealer shall comply with the conditions noted below. If he fails to comply with any one of these, his licence is liable to be cancelled.

(Seal)

Controller of Weights & Measures,
Goa, Daman and Diu

Date...

Place...

Note.— In the case of a firm, its name with the names of all its members should be given in paragraph (1).

Conditions of Licence

1. The person in whose favour this licence is issued shall—

(a) comply with all the relevant provisions of the Act and Rules for the time being in force;

(b) not encourage or countenance any infringement of the provisions of the Act, or the Rules for the time being in force and shall report without delay to the Inspector any infringement they may come to his notice;

(c) exhibit this licence in a conspicuous part of the premises to which it relates;

(d) comply with any general or special directions that may be given by the Controller of Weights and Measures, Goa, Daman and Diu Panaji; and

(e) surrender the licence if and when required to do so by the Controller or any other officer employed under the Act.

2. Every condition prescribed after the issue of this licence shall, if notified in the official gazette, be binding on the person/persons to whom the licence has been granted.

SCHEDULE XV

(See rule 28)

Licensing and renewal fees for manufactures, repairers or dealers in weights, measures, weighing or measuring instruments

	Fee for the grant of renewal of licence	Security deposit	
(1)	(2) Rs.	(3) Rs.	(4)
Manufacturers of one item (Weights or Measures or Weighing instruments or measuring instruments).	50.00	..	

Fee for the grant of renewal of licence
Security deposit

(1)	(2) Rs.	(3) Rs.	(4)
Manufacturers of more than one item (Weights or measures or weighing instruments or measuring instruments).	100.00	..	
Dealers in one item (weights or measures or weighing instruments or measuring instruments).	25.00	..	
Dealers in more than one item (weights or measures or weighing instruments or measuring instruments).	50.00	..	
Repairers of weights measures and beam scales.	10.00	50	
Repairers of platform weighing machines weighbridges, etc.	25.00	100	

SCHEDULE XVI

(See Rule 28)

Register of Licenced manufacturers/repairers/dealers

In weights/measures/weighing instruments/
measuring instruments

OFFICE OF THE CONTROLLER OF WEIGHTS
AND MEASURES, GOA, DAMAN AND DIU

Licence No.	Date of issue	Name, Parent age and residential address of the manufacturer/repairer/dealer	Place where the workshop is situated	Articles to be manufactured, repaired, sold	Trade mark/monograms being used	Orders regarding cancellation of licence disciplinary action if any	Result of appeal	Remarks
1	2	3	4	5	6	7	8	9

Note.— 1. In the case of a firm, its name with the name of all its members shall be given in column (3).

2. Column (6) does not apply to repairers and dealers.

SCHEDULE XVII

(See Rule 31)

Form for Registration

Form A

Application for the registration of Establishment

1. Name of the Proprietor/Director/Manager/Owner ...
2. Age of the Proprietor/Director/Manager/Owner ...
3. Permanent address of the Proprietor/Director/Manager/Owner ...
4. Name of the Establishment ...
5. Address of the Establishment ...
6. Whether Public or Private concern ...
7. Kind of Trade or Commerce ...
8. Name of the other Partners and address ...
9. Names of the employees or Agents and address ...
10. Number of weights, measures, measuring or weighing instruments in use or kept in possession ...
11. Particulars of the verification of those stated in 10 ...
12. Weights, measures etc. acquired by succession/transfer/sale/or any other mode ...
13. Documents in support of 12 ...
14. General ...

Submitted to the Inspector of Weights & Measures for further needful.

Place.

Date.

Signature of the Applicant.

FORM B

Certification of Registration

GOA, DAMAN AND DIU WEIGHTS & MEASURES
(ENFORCEMENT) ACT, 1968

Registration No. ...

This is to certify that Shri ... has registered his Establishment ... in the Office of the Inspector of Weights & Measures, for the use of weights, measures, weighing and measuring instruments in the trade ...

Signature of Registrating
Authority and Designation

SCHEDULE XVIII

(See rule 32)

Form of Appeal against an order of the Inspector
of Weights & Measures

- (1) Name and address of the appellant.
- (2) No. and date of the order of the Inspector against which the appeal is preferred.
- (3) Whether the appellant desires to be heard in person or through an authorised representative.
- (4) Grounds of appeal.

Place ...

Date ...

Signature of appellant ...

Controller of Weights & Measures,
Goa, Daman and Diu